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THE

LONDON JOURNAL

OF

Arts and Sciences;

CONTAINING

FULL DESCRIPTIONS OF THE PRINCIPLES AND DETAILS OF

EVERY NEW PATENT,

ALSO

Original Communications

ON OBJECTS CONNECTED WITH

SCIENCE AND PHILOSOPHY,

PARTICULARLY SUCH AS EMBRACE THE MOST RECENT

INVENTIONS AND DISCOVERIES

IN

Practical Mechanics.

BY W. NEWTON,

CIVIL ENGINEER AND MECHANICAL DRAFTSMAN:

AND BY C. F. PARTINGTON,

OF THE LONDON INSTITUTION.

VOL. IV.

[SECOND SERIES.]

London:
PUBLISHED BY SHERWOOD, GILBERT AND PIPER, PATERNOSTER ROW;
SIMPKIN AND MARSHALL, STATIONERS' COURT; AND W. NEWTON,
OFFICE FOR PATENTS, 66, CHANCERY LANE.

1830.

GUTHRIE, PRINTER, 16, SHOE LANE.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. XIX.

[SECOND SERIES.]

Original Communications.

ART. I.—ON M. A. BERNHARD'S PATENT FOR RAISING WATER.—*(See Vol. III.)*

To the Editors of the London Journal of Arts, &c.

GENTLEMEN,—The difficulties which have arisen in discussing the principle upon which water is raised and discharged by Mr. Bernhard's machine, contrary apparently to received theories upon the subject, induce me to submit the following explanation to the attention of your scientific readers. Taking the fact as stated—that a column of water is discharged á vacuo from a height of forty feet above that of the torricellian experiments—the immediate causes of that result appear not to have presented themselves to your correspondents. Both the causes and the result are perfectly consonant to established theories, and serve indeed to confirm the accuracy of principles founded upon experiments.

An extensive knowledge of chemistry is of importance to those engaged in the construction of hydraulic and pneumatic machines, in order to insure a proposed effect from the operation of combined causes; without this—a discovery, however valuable, may be deemed rather the effect of accident than the result of intellectual skill.

As I purpose making experiments only the foundation and the conclusion of my argument, I trust my observations may prove conducive to the interests of science, and to the improvement of hydraulic inventors in the principles of their specific branch.

Mr. B. supposes "that the column of water in the experiment must have increased more than double" by expansion of the water, by means of heat applied to the column in vacuo. To this position you and your correspondent Observator naturally demur—as being "contrary to all established theory, and inconsistent with all previous experiments upon that subject." In order to render it perfectly clear—I will first shew the composition of water, and the effect of fire, in altering its *chemical* combinations; and then treat of the expansion and elasticity of liquids, and vapors—or the *mechanical* effect produced by the action of caloric.

Pure water, that is, water not containing any earthy, alkaline or metallic solution, can be obtained by distillation only, excepting it be formed from its component principles by means of the electric spark, or by fire. Water is composed of oxygen gas, which is the principle or matter by which flame is supported, and of hydrogen gas, which is a substance highly inflammable. These two substances, when in chemical affinity with a certain portion of caloric, which constitutes the fluidity of the combination, form water. The proportion of these two gases in the formation of water is 85 of oxygen, to 15 of hydrogen gas by weight. If pure oxygen and hydrogen gases be mixed together in a close vessel, they remain unaltered; but upon being fired by a lighted taper, or an electric spark, the whole is reduced if mixed in the above proportion, to a body of water precisely equal in weight to that of the gases employed.

Now the specific gravity of oxygen gas is .00135, the specific gravity of water being always considered as 1.00000; and the specific gravity of hydrogen gas is about .00010; consequently, the usual *bulk* of an equal weight of hydrogen is as 135 to 10 of oxygen, or thirteen and a half times greater. Multiply then 15 by 13.5=202.5=the bulk of hydrogen gas to 85 parts of oxygen. One hundred parts in bulk of water, consist therefore of 30 parts of oxygen, and 70 of hydrogen in round numbers.

All water, whatever solution or extraneous matter it contains, is composed of this proportion of oxygen and hydrogen gases. Of the waters used for domestic and hydraulic purposes—snow and rain waters are the most pure, then follow the waters of rivers, lakes, and ponds, (saving alluvial deposits and impregnations); then pump waters; and lastly sea water, which besides mechanical suspensions of various matters—holds in chemical solution different salts to a great extent.

The specific gravity of sea water to river water, is as 1.158 to 1.000; from the greater specific gravity of sea water—ships heavily laden which have performed their voyages well in the ocean, have sometimes sunk in rivers.*

All waters exposed to the atmospheric air largely absorb it, and retain it with great strength of affinity;—indeed, the entire expulsion of atmospheric air from water is a matter of great difficulty—the fiercest fires only effect this object partially. Carbonic acid, and carburated hydrogen gases impregnate almost all waters, in consequence of the continual decomposition therein of animal and vegetable matters. These gases are likewise strongly retained in chemical solution. These are all *elastic* compressible fluids, water itself is an *unelastic incom-*

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* A cubic foot of river water weighs 1000 ounces avoirdupois=to 62.5 pounds. A cubic foot of sea water weighs on the average 73 pounds avoirdupois.

pressible fluid. The specific gravity of atmospheric air (not close to the ground), is .00120; carbonic acid gas is heavier.

The knowledge of these facts is essential to hydraulic engineers, and to the just decision of the question—what are the immediate causes of the raising and ejection of water in vacuo, by M. Bernhard's machine, at an elevation of forty feet, or any other, above the torricellian column ?

The raising is not effected by expansion of the water, in consequence of the application of heat, as supposed by him ; nor is the discharge in any considerable degree effected by the condensers, which for any practical purpose upon a large scale, may, considering their expense, be dispensed with.

This leads us to the consideration of the effects of fire, in altering the chemical combinations of water. The first is the separation of the atmospheric and other elastic gases accidently absorbed or formed in the water, and retained by solution, *i. e.* by chemical affinity. This separation as to rapidity, and completeness, is governed by the intensity of the heat applied; as to quantity of gases evolved—the result will depend upon the quantum absorbed by a given bulk, and the renovated supplies of the fluid. The second chemical effect of fire acting, as in this and similar cases, upon *iron* boilers, tubes, or retorts, which are occasionally, by the intensity of the fire, heated partially to a red heat, is the decomposition of portions of the water, first converted to steam, and then forced into contact with the ignited iron.

This decomposition reduces the water, then in a state of elastic vapor, to its original elements ; its oxygen gas, in consequence of its strong affinity to iron, is rapidly combined with the heated metal, which becomes oxided, that is reduced to a calx. The hydrogen of the water decomposed is at the same moment disengaged, and evolved with amazing force, in consequence of its specific gravity being only one ten thousandth part of that of the particles of water destroyed.

These evolutions by the action of fire upon water, namely the disengagement of elastic gases held in solution, and the decomposition of portions of the water itself, produce no *mechanical,* or very perceptible effects when water is boiled however violently, in open vessels, under the usual atmospheric pressure. This pressure is ascertained to be at a medium about 15 pounds avoirdupois upon the square inch, or above 2100 pounds upon every square foot considered as the basis of a perpendicular column of air of the entire height of the atmosphere. The effects, therefore, of the evolution of gases in the open boiling of water upon the body and surface of the liquid, are only the successive production and discharge of an immense number of air bubbles, and a partial rising of the body of the boiling water in the vessel, in consequence of the evolution of the gases being more rapid at the bottom of the vessel, than is their discharge at the top.

But from the same causes very different effects—as to *mechanical* results—are produced in close vessels, and above all in vessels, or tubes, in which a partial vacuum is formed. This leads us to the consideration of the expansion and elasticity of liquids when in vapor, or the *mechanical* effects produced by the action of caloric, and the general application of the principles developed to the subject of Mr. Bernhard's invention.

In one sense—the mechanical effects of the action of caloric upon elastic fluids, and upon liquids, may be deemed the immediate results under certain circumstances of the previous chemical decompositions, and evolutions described. But besides these, there are certain effects *purely mechanical,* occasioned by the action of caloric upon bodies. The expansion of solids, and liquids, and the elastic power produced by accessions of caloric, are of this nature. I beg a distinction may be kept constantly in view between the meaning of the terms, fire, and caloric.

Fire, according to the usual acceptation, is the visible flame, or body of ignited matter,—caloric is one of the results of *combustion.* In all cases of combustion, oxygen is destroyed by the burning body,—light and caloric are evolved, and new gases and substances are produced by the decomposition of the ignited mass. We put fire to a mass of inflammable matter, the atmosphere supplies the oxygen, and that all pervading substance, chemically termed caloric, which is the immediate agent in producing the effects we are about to notice, is disengaged.

The expansion of unelastic incompressible fluids, such as mercury, oil, and water, by any given accession of caloric, is to be carefully distinguished from the expansion produced by the same cause, in cases of elastic fluids, and liquids when in vapor. Expansion of an unelastic incompressible fluid cannot be effected by the removal of atmospheric or other pressure, nor can a contraction of such take place, so as to alter its specific gravity by the application of any mechanical power,—except by caloric only. But in cases of gases and other elastic fluids, and of liquids in vapor—besides the action of caloric in augmenting or diminishing the bulk, similar effects are produced by abstraction or addition of pressure.

This distinction is founded upon an invariable principle of nature ; the particles of liquids are in a state of mutual *attraction*, the degree of which pressure cannot alter,—the particles of all elastic gases are invariably in a state of mutual *repulsion*, always inclined to recede and take up greater distances.

Attraction and repulsion, like magnetism, appear to be qualities inherent in different modifications of matter impressed by the will of the First great Cause. Human reason is reduced to the necessity of treating what it cannot comprehend, as a principle or cause, in order to apply visible and tangible results to the purposes of life.

A question arises, what is the quantum of expansion which a given bulk of water may receive by the accession of any given quantity of caloric ?

Now, the maximum of density of water, that is, its greatest specific gravity, is not at or below the freezing point, as generally supposed ; but at 42°.5 Fahrenheit. This result, by experiment, agrees with the fact, that ice is specifically lighter than water ; although it is certain that there is a continued abstraction or evolving of caloric from water, from the temperature of 42°.5 to 32°.0 the freezing point—otherwise the water could not freeze.

The expansion of water by heat, *under the common pressure of the atmosphere*, which, notwithstanding Mr. Bernhard's supposed vacuum, I shall prove to be the expansion we have to consider in this machine, is as follows :—

Conceive 100,000 oz. avs. = to 100 cubic feet of water, put into an open vessel or tube, and an even gradual increase of temperature occasioned—then at

* Temp. Faht.		Bulk in cubic ft. and decl. parts.	
42°.5	—	100.000	maximum of density or specific gravity.
82.5	—	100.273	
122.5	—	101.006	increase of one cubic foot, by expansion.
142.5	—	101.495	expansion at the top of Mr. B.'s hot fluid ascending pipe.
172.5	—	102.260	
212.0	—	104.500	expansion at the boiling point of water, which *is the maximum*; for at this point, the absorbed gases are strongly expelled or evolved, and the particles of the fluid are separated by the action of the caloric absorbed, and rapidly form steam, an elastic vapor subject to the same general mechanical laws that all gases and other elastic vapors are subjected to.

The expansion, therefore, of a column of water heated evenly throughout to the temperature of 212°.0 under the pressure of the atmosphere, cannot exceed, as Observator remarks, one-twentieth of the original column, at its maximum of density.

But Mr. Bernhard produces a vacuum, (we will give him the benefit of supposing it nearly complete) and he places his fire under a torricellian column of water in vacuo, at the temperature

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* Fahrenheit's thermometer is used by the English, Dutch and some other northern nations. Reamur's is used in France, Russia and by the southern nations of Europe; his scale places the freezing point of water at zero, and counts 80 degrees to the boiling point.

Rule to find the number of degrees of Reaumur's scale equal to a given number on Fahrenheit's :—

$$\frac{(F^\circ.-32)}{2.25}=R^\circ.$$

To find the number on Fahrenheit's equal to a given number of Reamur's scale :—

$$(R^\circ.\times 2.25+32=F^\circ.)$$

of 40° to 60°. Now, what is the first effect? The water in the boiler and bottom of the column, instead of requiring to be raised to the temperature of 212° before the adventitious gases are evolved, and elastic vapor rapidly formed—requires only the temperature of 132° to 142° to destroy the chemical affinities, and the attraction of the particles of the water itself; which being raised to a state of ebullition in vacuo, by this *lower* temperature, is rapidly converted to elastic vapor.

This material point—the difference of the boiling points of water in vacuo, and under the ordinary pressure of the atmosphere, has not been adverted to by any party, in discussing this novel subject, although the mechanical effects of the machine arise in the first instance from this circumstance.

But it is not a heat of 140° or 212° applied evenly to the *entire column* of water; *but a heat of* 600° *to* 800° *Fah^t.* applied *exclusively* to the boiler or retort, which acts powerfully upon the water therein, and upon the lower strata only of the torricellian column.

Now, to judge rightly of the effects which must be produced by such a powerful agency upon the column so circumstanced, we must recur to the chemical principles which we have developed, and to the mechanical laws which govern elastic fluids generally.

Besides the rapid evolution of the atmospheric air and elastic gases contained in the water, and the generation of elastic vapor, we have noticed the occasional decomposition of particles of that vapor into their original elements, in consequence of parts of the iron boiler or retorts being heated to a red heat, about 860 Fah^t. When this happens, the hydrogen formed, *suddenly* occupies 10,000 times the space of the particles of water destroyed, or about six times the space of the elastic vapor from water; for heated steam occupies about 1,800 times the space of the bulk of water from which it was raised. The other evolved gases occupy from 1,000 to 1,500 times the space of water.

Now, upon all these gases and vapors, each additional dose of caloric operates to produce a greater degree of expansion; that is, the elasticity of all elastic fluids increases with the temperature; the repulsive power, and the distance of their particles, are proportionately increased.

In the open air, the elasticity of vapor at 212°, is just equal to that of the atmosphere; it ordinarily balances a column of mercury 30 inches high; but at 300° it will balance a column of 111.°8 inches; and at 325° one of 140.°7 inches. The effect, therefore, of 600 to 800 degrees of heat upon the elastic gases and vapors evolved and formed at the *bottom* of a torricellian column, these elastic fluids being themselves produced at the low temperature, 132° to 142°—must be beyond all calculation. The expansion thus produced, may properly be called the *mechanical* effect of the agency of caloric.

Now, by the general laws of elastic fluids, their particles do not touch or come within the reach of mutual attraction, for if they did, the repelling force, and consequently the elasticity, must cease. This is the case, upon the condensation of the steam in engines. In all cases, the re-action from the sides of vessels, containing elastic fluids, must be equal to the spring or elastic power of the fluid, or they would burst. Any given elastic fluid acts with equal force upon equal surfaces, *i. e.* it acts equally upon every point of the surfaces exposed to its action. All elastic fluids, when at rest, press equally in every direction at the same moment; and, finally, when any force presses upon an elastic fluid, it presses in all directions at the same time.

From these general preliminaries and laws, I form the following conclusion as to the modus operandi of Mr. Bernhard's machine; if I should be in error, I shall feel obliged for any rectification, founded upon established principles. If these be found sufficient for a satisfactory explanation of the effects produced by any invention, I apprehend we need not look out for new theories.

The rapid evolution of gases, and the formation of elastic vapors at the *bottom* of Mr. B.'s torricellian column, raised at a *low* temperature, and their elasticity suddenly and immensely increased by large and constant accessions of caloric, are the proximate and amply sufficient causes of the effect produced, namely, the discharge of a stream of water at the height of 70 or 700 feet, if you please. These elastic powers act against the boiler or retorts, where they find a re-action equal to their force. They are formed in such abundance, that they cannot be discharged but in an insignificant degree, through the super-incumbent column of water, *upon whose base* they act with a force proportioned to the square surface of that base, the quantum of elastic fluid and the degree of expansion. Part of those gases and vapors are again reduced, or condensed in their passage through the water of the column, heated on the average to about 140° only. But the great expansive force of the elastic vapors formed, and not discharged nor re-condensed, raises *bodily* the super-incumbent column, and forces it into the descending pipe, whence it is discharged. A partial vacuum is from time to time formed in the boiler or retort, which is instantaneously filled up by the admission of fresh supplies of water from the cistern below, by means of the atmospheric pressure upon its surface; and the operation continues at intervals, so long as the supply is continued, and the boiling temperature kept up.

After the first junction of the ascending column with the torricellian column in the descending tube, the boiling point during the remainder of the operation, is 212° F^{t}. From the moment of that junction, supposing the vacuum between the two columns to be nearly complete, the ascending column forced into the descending pipe, displaces the column in that pipe, notwithstanding the pressure of the atmosphere upon the surface of its supplying cistern. There is therefore an end of the torricellian part of the operation, from the period of the first action of the ascending column of water upon the other, the whole of which latter column must necessarily be forced out of the descending tube, before one particle of the column from the hot fluid ascending pipe can be discharged. Indeed it appears to me that the formation of the second torricellian column in the descending pipe, and all the expense of that part of the machine, may be saved; for when the discharge takes place, the opposing weight of the atmospheric pressure must be overcome equally, whether the discharge be made into a cistern, through a valve in the descending pipe, or in any part of the ascending pipe; for by the rule the quiescent atmospheric pressure is equal upon any given surface, and in all directions at the same moment.

The material advantages of the vacuum and torricellian column in the hot fluid ascending pipe, are—that the water is made to boil at 70° or 80° degrees lower temperature; that consequently a more immediate, rapid, and abundant evolution of elastic fluids is produced; and that when the discontinuity of the discharging stream happens (which is owing to the uneveness of the action of the fire, and the consequent unequal production of the several gases and vapors) the pressure of the atmospheric column may not impede the most advantageous manner of renewing the discharge.

A few observations upon the *expansion* of the water in the ascending pipe, and the *condensation* of the elastic vapours produced may be necessary. Mr. Bernhard observes, p. 285, that " it is evident that such column of water must have increased more than double." I have given the actual experiments which prove that the expansion of water, an unelastic and incompressible fluid, raised to the temperature of 212° Ft. does not exceed under the pressure of the atmosphere, one twenty-fifth part of its bulk at a maximum of density, and this one twenty-fifth is the maximum of *expansion* produced by the *mechanical* action of caloric. One foot therefore is the expansion of a column 25 to 26 feet high under the most favourable circumstances, namely, the even and simultaneous heating of all parts of the column. Now *even this* degree of expansion in a torricellian column of equal height can scarcely take place in Mr. Bernhard's machine. The base of his column in vacuo, rests upon the reservoir of water contained in the boiler or retort. The fire is applied to a much larger surface than the base of the column, and acts powerfully upon the body of water in the manner we have described; and has effected the evolution of elastic fluids and gases from that portion of the water, *before* the column can possibly be affected to any height. Now the pressure upon the upper surface of the column by those vapors which have passed through it *without condensation*, must be at least equal to the pressure of the outward atmospheric column, probably much greater, for their average spring or elastic power is greater. Consequently the expansion of a given column of water in vacuo, when pressed by an elastic power, suddenly generated, equal to the atmospheric pressure, cannot be greater than the expansion of a similar column under the atmospheric pressure, other circumstances being equal. *The discharge of the water by the exit valve is therefore not the consequence of its expansion,*—THAT IS IMPOSSIBLE.

Indeed Mr. Bernhard's own experiment settles the point. He says, p. 284, that he fixed a thermometer nearly at the top of the ascending pipe, "by which it will be perceived that the temperature of the water, when at that height, is *one hundred and forty* only." The specific gravity of water at 140° is .985; *i. e.* nearly the same as water at 40° or 50°.

We have shewn that the pressure upon Mr. Bernhard's torricellian column must, by the action of the elastic fluids raised, become greater than that of the atmospheric pressure upon the discharging valve, otherwise no water could be emitted by the descending pipe. Mr. B.'s fluid at the top of his pipe is therefore, at least, of the same specific gravity at any given temperature, as a similar fluid would be under atmospheric pressure, consequently it cannot have been reduced in its specific gravity one half; and as specific gravity and the expansion of liquids are only inverse rules (supported by experiments) proving the actual bulk of any quantity, Mr. B.'s column of water *could not have increased,* as he says, "MORE THAN DOUBLE," *nor in any other ratio* than the universal laws of nature, regulating matter under the several modifications, admit. Those laws have been discovered and settled as principles, in consequence of the *unvarying* accordance of ALL EXPERIMENTS hitherto made. Men of science universally acquiese in receiving certain established principles as the *only sure* guides upon which to found their conclusions in tracing effects to sufficient and proximate causes; which proximate and adequate causes again resolve themselves into more remote and higher principles or causes, till we at last arrive to that great, unfathomable, unsearchable, and incomprehensible source of all powers and agencies, before whose immeasurable wisdom, the utmost grasp of the highest human intellect, is but as a mathematical point in the boundless regions of unconfinable space, yet unfilled with revolving spheres.

ÆOLUS.

P. S.—The interest excited by this subject has extended this letter to a small treatise, but it may prove extensively useful. The condensation by Mr. Bernhard's machine, and a general view of its efficacy, as a new mechanical power, are reserved for a future number.

ART. II.—ON BERNHARD'S PATENT FOR RAISING WATER.

To the Editors of the London Journal of Arts, &c.

SIRS,—Your correspondent, Mr. M. A. Bernhard, has offered to the public, through the Journal of Arts, &c. &c. for September, some explanation of his "Method, Principle, or Apparatus," for raising water or other fluids; referring also to an experimental exhibition of an apparatus in the Kent Road, which you had inspected, and witnessed the fact of raising *volumes* of water to the top of a shaft seventy feet high.

It is far from my intention to question the existence of facts that respectable parties have been witness to, but I must beg leave to observe, by the way, that Mr. Bernhard's explanations are far from being satisfactory—indeed the facts stated are at variance with the received opinions on this subject, and their seems but little analogy between the effective means and the end proposed to be accomplished.

Your correspondent must distinctly state his "Principles and Method," and more accurately describe his "Apparatus," before he can expect the common sense of mankind and the judgment of scientific men to concur in conclusions so anomalous to experience.

A few years ago an eminent engineer proclaimed to the world that he had invented a hydro-mechanical principle, by which he was enabled to raise water many thousand feet high, and that he had an apparatus exhibiting the fact on his own premises, in the vicinity of London,* this invention however, passed away, and has long since slept with its predecessors of the same character. Mr. Bernhard's pretensions do not, however, raise water so high as the engineer above refered to, he is satisfied with raising water to the height of seventy feet, which is in itself a fact of sufficient importance, not only to entitle it to the attention of engineers and men of practical science, but to the public at large, who are interested in so valuable an invention. Your correspondent ought therefore to give a clear and lucid statement of the general principle of his method and apparatus, and a full detail of their application, by which he can raise water to the height of seventy feet. If the facts stated are correct, the most rigid scrutiny will only establish their character.

Mr. Bernhard himself must be deeply interested in establishing such important results, for if the assumed facts are clearly made out, he may depend upon having opened as rich a mine of wealth, and found as important a secret as ever the alchymical Dousterswivel proposed to the deluded hopes of Sir Author Wardour.*

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* See the Repository of Arts for 1813 or 14.

As a man of science, Mr. Bernhard will of course feel himself called upon to give a full elucidation of his plan. In real science there is no mystery, and facts speak their own peculiar language. Such evidences, when clearly stated and justly appreciated, will convey conviction to the most scrupulous minds. After what has been said by yourself, Mr. Editor, and others on this subject, your correspondent's next communication will doubtless place the facts of this case on the most decided grounds; waiting which,

I am, Gentlemen,
Your obedient Servant,
J. RAYNER.

ART. III.—ON THE PARALLEL MOTION OF A STEAM ENGINE.

To the Editors of the London Journal of Arts, &c.

GENTLEMEN,—The very useful paper on the parallel motion of a steam engine by Mr. Aris, which appeared in the last number of your Journal, has induced me to offer one connected with the same subject. The rules I have proposed for producing a parallel motion are, I believe, more accurate than any which have heretofore been applied, and have not before, to my knowledge, appeared in print.

THE following rule for computing the proper lengths or radius of the bridle rod of a parallel motion, for any radius of the back links, is given in Mr. Farey's treatise on the steam engine; it is attributed to Mr. Stevenson, of Newcastle.

(See Plate III, figure 1.)

Rule.—Square the distance in inches A. D. from the centre of the great lever to the joint D, by which the back links are suspended; divide that space by the length of the parallel rods E, C, in inches; the quotient is the radius of the bridle rod F, E, in inches.

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* See the Antiquary.

Example.—The great lever A, B, is 111 in: radius; the joint of the back links D, E, 66, in: radius; and the length of the parallel rods E, C, 45 inches. Then

(66 in: squared=) 4356 in:
————————————=96.8 in: for the
radius of the length of parallel rods, 45 in: bridle rods.

This rule applies with sufficient accuracy for most practical cases, but it is not strictly correct, and although the error is not sensible, within the limits of the proportions usually given to the parallel motion of a steam engine, it would become considerable if it were required to proportion a parallel motion, having the back links suspended at a much shorter radius, than half that of the great lever.

The following rule will apply in extreme cases, with a very trifling deviation from accuracy: —

Having given the vibration* of the end of the great lever, and also of the joint by which the back links are suspended; the length of stroke of the piston, (or the chord of the arc which the end of the great lever describes) and the same of the joint of the back links, take the difference between the vibration *a*, *b*, of the great lever, and the vibration *c*, *d*, of the joint of the back links, for the proper vibration of *e*, *f*, of the bridle rods, (or the versed sine of half the arc, their moveable ends, E, should describe); the sine *E*, *f*, of the arc *E*, *e*, must be equal to *D*, *c*, half the length of stroke of the back links;

Then to find the radius of the bridle rods—

Rule.—Square the half stroke *D*, *c*, of the back links; add to that square, the square of the vibration *e*, *f*, of the bridle rods, and

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Note.—The vibration of the end of the great lever, or of any joint, moving in a similar manner, is the versed sine of half the arc described by that joint; thus, *a*, *b*, is the vibration of the end of the great lever A, B, and *c*, *d*, is the vibration of the joint D.

divide the sum so obtained by twice the vibration *e, f,* of the bridle rods; the quotient is the proper radius for the bridle rods.

Example I.—The great lever A, A, being 111 in: radius, with 6 in: vibration; then the vibration *e, f,* of the bridle rods is 3 in: if the back links are suspended at half stroke; and the half stroke of the back links (which is equivalent to the sine of half the arc described by the bridle rods) = 18 inch. Then by rule:

(18 in: squared=) 324 in: + (3 in: squared=) 9 in: = 333 in: ÷ (3 in: × 2) = 55½ in: or half the radius of the great lever for the radius of the bridle rods.

Example II.—For an extreme case of the back links suspended at one-sixth of the radius of the great lever, or at 1 foot radius; the vibration of the back links = 1 in: the variation of the bridle rods is (6-1) = 5 in: and the half stroke of the back link = 6 in:

Then by Rule; (6 in: squared=) 36 in. + (5 in: squared =) 25 in: = 61 in. ÷ (5 in: × 2) = 6. 1, in: for the radius of the bridle rods.

This rule, and Mr. Stevenson's, have been tried on a diagram, the great lever being as above stated, 111 in: radius and 6 feet stroke; the vibration of the end of the great lever 6 in: the back links suspended at ¼ stroke or 27¾ in: radius; the half stroke of the back links was then 9 in: their vibration 1½ in; and the vibration of the bridle rods 4½ in: the parallel rods 83¼ in: long. With these proportions, Mr. Stevenson's rule gives 9¼ in: for the radius of the bridle rods, and would allow the piston rod to depart about 2.83 in: from the vertical line; the other rule gives 11¼ in: for the radius of the bridle rods, and would allow the piston rod to depart about ½ in: from the vertical line.

When the back links are suspended at one-third stroke, or 37 in: radius, Mr. Stevenson's rule gives 18½ in: radius of bridle rods, and would allow a little more than ½ in: deviation in the piston rod; the other rule gives 20 in: for the radius of the bridle rods, and allows about one-sixth in deviation in the piston rod.

In extreme cases, in the other sense, that is, when the back links are suspended very near the end of the great lever, the two rules give considerably different radii for the bridle rods; but from the great length of those radii, the vibrations of the back links and bridle rods bear a small proportion to half the length of their strokes, and the results of both rules are very nearly similar. For instance, with a beam of the above proportion, when the back links are suspended at ⅔ stroke, or 74 in: radius, Mr. Stevenson's rule gives 148 in: radius for the bridle rods; the other rule gives 145 in: radius but with either radius, the bridle rods will not suffer the piston rod to depart more than one-tenth of an inch from the vertical line.

The piston rod of a steam engine will only move in a truly vertical line, when the radius of the back links of the parallel motion is = the length of the parallel rods, because then the bridle rods and back links have equal radii and equal lengths of stroke, and therefore in every stage of the arcs they describe, they will deviate exactly the same quantity in opposite directions, from the vertical line; and the sum of their vibrations will, at all times, be equal to the corresponding vibration of the end of the great lever; but, in all other proportions of the parallel motion, that is, whenever the radius of the back links is not = the length of the parallel rods, the radii of the back links and bridle rods are of unequal lengths, while the sines of the arcs they describe are of equal lengths, and the sum of their vibrations will not at all times be equal to the corresponding vibration of the end of the great lever; the successive deviations of the piston rod from the vertical line, throughout the length of its stroke, will be equal to the differences between the vibrations of the great lever, and the sum of the vibrations of the back links and bridle rods; and by calculating those differences at several places in the length of the stroke, a curve may be laid down, which will be the real path of the piston rod.

I am, Gentlmen,
Your's &c.
PLUMB.

Recent Patents.

To Samuel Walker, *of Beeston in the parish of Leeds, in the county of York, Cloth Manufacturer, for his having invented or found out an improved apparatus which he denominates an* " Operameter," *applicable to machinery for dressing Woollen and other Cloths.*—[Sealed 20th February, 1829.]

The apparatus which forms the subject of this Patent is a train of wheels and pinions enclosed in a box, having indexes or hands attached to the central arbor like a clock, and a dial face by which the number of rotations of a shaft projecting from the hinder part of the box is shown; and this projected shaft being connected by any convenient means to the working parts of a gig mill, a shearing frame, or any other machinery of that kind for dressing cloths, the number of rotations made by the operating machine will be shown by the indexes on the dial plate of the Operamater.

In dressing cloths it is often found that too little or too much work has been expended upon them, owing to the idleness or want of skill of the workman. By the employment of the Operameter this will be avoided, as the master or overlooker will be enabled to direct the workmen to give a certain quantity of work to each cloth, and this will be readily known by inspecting the dial.

SPECIFICATION.

" My improved apparatus, denominated an Operameter, is a peculiar construction of counting machine intended to be connected to a gig, for raising the pile of woollen cloths, or to a shearing machine for cropping the pile, or to any other machine employed for the dressing of cloths; by which the number of rotations made by the gig barrel, or by the cutter, or by any other of the operative parts of any such machines, may be known by inspecting the face of a dial.

" The object of this apparatus is to measure, ascertain and register, the quantity of work done; that is, the number of rotations of the working parts of the gig, or other machine, to the operations of which the cloth has been submitted ; by the attachment therefore, of this *Operameter* to any of the machines employed for dressing cloth, the requisite quantity of work may be apportioned to each piece, without depending on the fidelity of the workman; and the actual work done will be shown without the possibility of deceiving the employer.

" The shape in which I have found it most convenient to construct the apparatus is exhibited in the drawings; see Plate I. Figure 1, represents the external appearance of the Operameter, which is enclosed within a box or case of metal, having partitions within, and a dial plate without, on its face, with numbers similar to a clock, and hands attached to the outer extremities of arbors moved by wheel work within. Fig. 2, is a side view, exhibiting the internal mechanism, the outer case with the internal partitions being partly shown in section. Fig. 3, represents the wheel work as seen in front, the face plate being removed, and the front of the upper compartment also. Fig. 4, is the back part of the Operameter, with a small dial corresponding to the small dial in front. Fig. 5, exhibits the wheel work in the back compartment of the case (shown also in fig. 2,) which is exposed to view by removing the back plate and dial; seen in fig. 4.

" The machine, whether a gig, a shearing frame, a brusher, or any other machine for dressing cloth, whose movements are to be registered by this apparatus, may be connected to the Operameter at several points, that is, at the sides, the top, the bottom, or the back, as convenience may require.

" I shall first describe the most simple mode of communicating the rotatory movement of the machine to the wheel work of the register, and that which I usually employ when connecting the Operameter to a gig; *a*, is a shaft passed through the side of the case into the back compartment, shown at fig. 5; the outer extremity of this shaft *a*, is to be connected by coupling to the drawing roller or any other suitable part of a gig, or to the worm shaft, or other convenient part of a shearing frame.

"At the inner extremity of this shaft an endless screw *b*, is fixed, which takes into a toothed wheel *c*, and on the same arbor behind *c*, there is a smaller toothed wheel *d*, taking into a corresponding wheel *e*. The arbor of *e*, as may be seen in fig. 2, carries a bevel-toothed wheel *f*, which drives two corresponding bevel-toothed wheels *g*, and *h*, and these turn loosely on the vertical shaft *i*, being connected threto by hanging levers or catches, through the medium of the drum *k*, fixed on the shaft *i*, shown in section in the auxiliary fig 6. These catches turn in opposite directions, so as to cause one of the wheels only at a time to be locked to the shaft, and consequently which ever way the wheel *f*, turns, the vertical shaft *i*, will be driven round by the locking of one of the wheels *g*, or *h*. This contrivance is for the purpose of registering the movements of a reciprocating machine which ever way it may turn, by a continued rotation of the vertical shaft *i*.

"At the lower part of the vertical shaft *i*, there is an endless screw *l*, taking into the wheel *m*, on the long shaft *n*, *n*, carrying at its extremities what may, for distinction's sake, be called, the minute hands *o*, *o*, acting upon the small dials at the back and front of the Operameter. The same endless screw *l*, also takes into another wheel *p*, fixed on a cross shaft *q*, (see fig. 3,) on which shaft there is an endless screw *r*, taking into a toothed wheel *s*, the outer extremity of the arbor of which carries what may be called the hour hand *t*, acting on the face of the other dial, (see fig, 1.)

"It will now be perceived by the train of wheel work described, that a certain number, say 1400 rotations of the drawing roller of the gig, or of the worm shaft of the shearing frame, or any other actuating part of a dressing machine to which the shaft *a*, of the Operameter may be attached, will cause the indexes *o*, *o*, to traverse once entirely round the small dial plates, every rotation of which is represented by the advance of the index *t*, through one division of the circle on the large dial at the face of the Operameter.

" It may be necessary here to observe that an additional or idle hand is placed upon the same arbor, and made to turn round loosely as a check for the use of the overlooker. It is scarcely requisite to add that any variation in the diameters and teeth of the wheels may be made suitable to the speed of the working machine.

" As it may be necessary, according to the situation and construction of the gig, or shearing frame, the operations of which are to be registered, to attach the coupling either at the top, or bottom, or opposite sides of the Operameter to that already described, I have made the side pieces, *u*, *u*, *u*, *u*, at the back part of the case, (see fig. 5,) to shift their situations, in order that the shaft *a*, may be placed in either of the positions shown by dots, in all of which the endless screw *b*, will take into the wheel *c*, and drive the train in the manner above described.

" If it should be desirable to drive the Operameter by a coupling at the back part, I should in that case dispense with the shaft *a*, and its endless screw *b*, and in place of them introduce a shaft *v*, carrying a toothed wheel *w*, shown by dots in figs. 2, 4, and 5 ; the shaft being passed through a sliding plate, as in fig. 4.

" The shifting of the plates affords the means of putting the Operameter in and out of gear, and of adapting a larger or smaller wheel *w*, according to the speed with which the meter is required to register. Or instead of the shaft *v*, and wheel *w*, a shaft *x*, and wheel *y*, likewise shown by dots, may be employed, both of which take into and drive the wheel *c*, which produces the movements of the Operameter in the way above described, and registers the number of revolutions of the working machine connected thereto.—*Inrolled in the Rolls Chapel Office, August*, 1829.

Specification drawn by Mr. Newton.

To THOMAS BONNER, *of Monkwearmouth-shore, in the County of Durham, Merchant, for his Invention of certain Improvements on Safety Lamps.—Sealed* 4*th December*, 1827.

THIS invention is an improvement on the Miner's Safety Lamp invented by Sir Humphrey Davey, in which the burning wick is inclosed within a cylindrical shield of wire gauze, in order to prevent the communication of flame from the lamp to the inflammable air or fire damp, as it is called, which frequently occurs in mines, and when ignited, produces such destructive explosions.

The wire gauze shield considerably obstructs the light of the lamp when in use, and from that cause, the miner is often tempted to remove the shield, which consequently exposes all around to imminent danger.

To increase the intensity of light given out by these lamps, without uncovering them, is therefore a desideratum, and such is the first object of this improvement; the second is a mode of extinguishing the light without opening it.

SPECIFICATION.

" My improvements consist, first, in a means of increasing the light of the lamp ; and, secondly, in methods of extinguishing the flame. Plate I. fig. 7, is a section of the lamp exhibiting the improvements. Figs. 8, and 9, are plans of the top of the lamp, shewing two covers of peculiar form for extinguishing the light. In fig. 8, the covers are exhibited open, and in fig. 9, shut.

" My first improvement for increasing the light of the lamp, is effected as follows. Instead of introducing a wick in the centre of the lamp, as is usually practised, I introduce several small wicks round a central tube, as shewn at *d*, fig. 8, by which means, by lighting one or more wicks, as occasion may require, I obtain either little or much light.

" These wick tubes are fixed in a metal ring, whose inner diameter is rather larger than the outer diameter of the fixed open tube in the centre of the lamp, and the outer diameter of the ring, is rather less than the diameter of the opening for the light on the top of the lamp; so that this ring, with the wick tubes fixed in it, slips easily in and goes round the centre tube, the inner edge of the ring resting upon a narrow ledge left on the centre tube to support it; or the outer edge of it rests on a ledge left round the opening for the light, as shewn at *c*. And as the ring is thereby at perfect liberty to revolve, the wicks are carried round by the trimming iron.

" The ring may either be level with the top of the lamp, or a little below it, but those parts of the wick tubes having the slits for trimming, must be above the ring, and a slit made on each side of them, but not opposite each other in the same tube.

" My methods of extinguishing the light, are as follows. First, *d*, *d*, shews two covers of peculiar form for extinguishing the flame while unscrewing the gauze top, which is enlarged in diameter at bottom, as shewn at *f*, *f*, to allow room for these covers; the light by means of these covers is thus prevented from being improperly exposed.

" The covers are formed of two pieces of thin metal, placed upon the upper side of the lamp, upon studs or otherwise, so as to traverse on the pin or screw *o*. The covers are carried over the light so as to extinguish it, by any mechanical means that may be preferred, but I adopt one or more catches affixed on the screw ring, as shewn at *e*.

" Secondly, I extinguish the light by an extinguisher, as shewn at *q*, suspended at the top of the gauze cylinder by a combustible substance, such as a piece or slip of wood, or paper, or otherwise, which extinguisher falls upon the light, when the combustible substance is either burnt or broken, by pressing upon the driver *i*.

"This extinguisher is formed of a thick circular piece of metal, of the same diameter as the interior of the gauze cylinder, or nearly so; it is shewn at *g*, fig. 7, and separately at fig. 10. It is made with two grooves to slide on two wires, *h*, *h*, fig. 7, to guide it on its ascent and descent, which wires are secured at the upper end to the brass top *p*, of the cylinder, and at the lower end to two of the outer wires.

"This extinguisher may also be suspended by a pin *k*, to be inserted at *l*, or *m*, or it may be any otherwise suspended. In fig. 7, *n*, shews a piece of metal or wire, to be used as a trimming iron, to which, however, I make no claim.—[*Inrolled in the Petty Bag Office, June*, 1829.

Specification drawn by the Patentee.

To WILLIAM STORY, *of Morley, in the parish of Batley, in the county of York, Plumber and Glazier, and* SAMUEL HIRST, *of the same place, Clothier, for their having discovered certain materials, which when combined, are suited to be employed in scouring, milling or fulling, cleansing, and washing of cloths and other fabrics, and by the employment of which materials considerable improvements in those processes are effected.*—[Sealed 10th March, 1829.]

THIS is an alkaline liquor, to be employed for extracting the grease in scouring wool or woollen cloth, and also as a saponaceous material in milling or fulling. It is prepared by the distillation of urine, which produces a strong ammoniacal liquor in which a certain quantity of soap is afterwards to be dissolved, and then the liquor being secured from the air, may be stored by for use.

SPECIFICATION.

" The material which we employ for cleansing, washing, scouring, and milling woollen and other cloths, is a saponaceous mixture, compounded of alkaline matters, with a small quantity of fat, which we prepare in the following manner. viz.—

" Take a large cistern, and fill it with human urine, in which cistern it should remain for about six weeks, in order to ferment. When that has taken place, take from the cistern about four hundred gallons of the fermented urine, and put it into an iron still, having a block tin worm passing through a refrigeratory vessel, as commonly constructed.

Add to the urine, in the still, about one pound of tallow prepared form beef suet, which tallow is for the purpose of preventing the froth that would otherwise arise in the ebullition.

" Distill these materials, and from the still when in operation take over into a cask, through the worm, about six hundred weight of ammoniacal liquor, or as it is chemically termed aque ammonia. Add to this ammoniacal liquor in the cask, about six pounds of the best mottled soap, previously dissolved; which will give the liquor an opaque appearance, and is designed by its substance, to assist the adhesion of the fibres of the wool in milling; and also the scouring and removing of any foul matters, which may have attached to the wool during the manufacture.

" Mix the dissolved soap well with the liquid ammonia, and then let the material thus prepared be carefully closed up in the cask by a bung, in order to exclude the atmospheric air.

" This liquor is then fit for the purpose of being employed as a saponaceous material for scouring, milling or fulling, cleansing, and washing of woollen and other cloths and fabrics."—[*Inrolled in the Inrolment Office in Chancery, September*, 1829.]

Specification drawn by Mr. Newton.

To Edward Heard, *of Devonshire Street, Vauxhall Road, in the parish of Lambeth, and county of Surrey, Chemist, for his invention of a certain improvement or improvements in Illumination or producing artificial Light.*—[Sealed 12th February, 1829.]

This invention consists principally in the employment of a variety of refuse materials of oily, resinous, and carbonacious natures, for the production of gas for illumination. It is also proposed to make candles of margaric acid, or a mixture of that material with other substances. The Patentee describes his invention in these words.

SPECIFICATION.

" Illumination or artificial light being usually produced from the decomposition of solid and fluid bodies, which are converted, by the agency of heat, into a gaseous state, and on ignition afford light, I therefore take from the class of those solid substances which have not been heretofore used for making inflammable gas, for that purpose a residuary matter obtained in the manufacture or preparation of tallow from raw fats, known in commerce by the name of greaves or graves, as also the residuary matters from other species of fats commonly called " stuff."

" I likewise take the residuary or refuse substances, which are obtained in manufactories where horns, hoofs, bones, hides, skins, leather, or other greasy or inflammable matters are employed, as also those left after the expression of oils from the seed, such as are known in commerce by the name of linseed oil, cake, rape seed oil cake, mustard seed cake, almond oil cake, poppy oil seed cake, and all others so produced; I also use beech nuts or mast cocoa nuts, and all others abounding in oil, which have not hitherto been generally or publicly known to have been employed for this purpose.

" I employ these solid bodies either separately or in combi-

nation with each other, and in such proportions as may be found most suitable for the production of light, of the best quality, and with most economy.

" These substances are to be placed in retorts or other proper vessels, and exposed to the requisite degrees of heat, eliminating or setting free their gaseous products, and which are afterwards to be collected and purified for the purposes of illumination, in any of the usual and well known methods.

" From the class of fluid inflammable bodies, as well as those of a bituminous nature, I take coal tar, the black oil obtained in the distillation of bones, and other animal substances, cocoa nut oil, and other similar inflammable bodies, and mix two or more of them together, in those proportions which may be found most advantageous for the production of a good light, and at the least possible expense, and which of course must necessarily vary according to the fluctuations of their prices at different periods of time, as well as the intentions of the operator.

" This compound oily mixture is to be decomposed by the application of heat, in a similar manner, and by the employment of similar apparatus to those usually made use of in the production of oil gas.

" In coal gas works the period at which I would introduce the oily mixture above named, into the usual retorts employed for the production of coal gas, would be that in which the coal has ceased to afford gas suitable for the purpose of illumination, and is producing the light carburetted hydrogen gas, which possesses but little illuminating power, the coke being then in a state of incondescence which is favourable to the immediate decomposition of this oily mixture, and for facilitating the formation of heavy carburetted hydrogen gas.

" As candles are also used as a source of artificial light, so I hereby claim the exclusive rights and privileges conferred by this patent to the application of a well known substance discovered by a French chemist, and termed by him " MARGARINE," to the manufacture of candles, to be used either separately, or in combination with wax, spermaceti, tallow, or stearine, in any proportions of one or more of these substances, as may be found most eligible to employ with reference to the intended quality or price of the candles so manufactured therewith.—[*Inrolled in the Inrolment Office, August*, 1829.]

Specification drawn by the Patentee.

To DAVID NAPIER, *of Warren-street, Fitzroy-square, in the County of Middlesex, Engineer, for certain Improvements in Machinery, applicable to Letter-press Printing.*— Sealed 2d October, 1828.

SPECIFICATION.

"THE improvements on letter-press printing machines, or presses, intended to be secured by this patent, are two in number; First, (in cylinder printing) the application of four feeding apparatuses to a machine with but one printing cylinder and surface; and, secondly, (in surface printing) placing the power for giving the impression centrally between four surfaces, and two forms of type, the outer surfaces being fixtures during the impression. But that my meaning may be more clearly understood (see the diagrams in Plate II. attached), and seeing that the nature and construction of printing machines are so universally known, it is obvious that any explanation which I may chance to give, beyond the said improvements, will be superabundant. Fig. 1, represents four feeding boards and apparatuses *a*, adapted to one printing cylinder *b*, which cylinder is intended to print both ways, consequently paper and ink must be supplied at both ends; the printing cylinder receives its motion from the surface, being connected thereto by the racks *c*, in the usual way, and the surface is impelled by a crank underneath, or in any of the ordinary ways; the inking apparatuses *d*, are the same in every respect with those adopted to "Napier's machines" (which machines are well known to the public) with the exception, that in this case they are moved by the wheel and pinions *e* from the cylinder, and in the other, by rack and pinion, from the surface.

" The feeding apparatuses are the same in principle with those adapted to my single and double imperial machines (which machines are equally well known), with the exception that in this case they are removed to a distance from the printing cylinder, and therefore have their motion conveyed to them by means of the strong gut band *f*, in the following way—(But let it be here observed that both ends of the machine are alike, therefore what is said of the one, will be equally applicable to the other) viz. One end of the gut *f*, is wrapped twice round, and made fast to the rigger *g*, which is a fixture on the end of the printing cylinder *b*, from thence it is passed once round the rigger *h*, which is loose on the spindle of the feeding cylinder *i*, and from thence conveyed inside of the frame (see the dotted line) and round the corresponding rigger on the opposite end, and again made fast to the rigger *g*.

" It will now be obvious, that as the cylinder *b*, revolves backward and forward by the action of the surface, so will the loose riggers *h*, which riggers are each provided with a ratchet or catch, so that though they go loose in one direction, they become fixtures the other, and bring round the feeding cylinder *i*, with them at every return: which feeding cylinder *i*, gives motion to the feeding cylinders *k*, by means of the endless tapes which conveys the paper to the printing cylinder (see the arrows.)

The feeding bar *l*, is brought down to take a sheet every alternate revolution of the cylinder *i*, exactly as it is in my imperial machines, as stated above; but the feeding bar *l*, is attached to the feeding bar *m*, by the connecting rod *n*, therefore, both come down and take a sheet at the same time; hence, the advantage of having the one feeder further removed from the printing cylinder than the other. Both sheets, it will be observed, pass to the printing cylinder between the same tapes as shown by the arrows. The gut-band *o*, which passes round the rigger *p*, upon the spindle of the feeding cylinder *k*, is for the purpose of communicating motion to the rollers *q*, with their endless tapes, which convey the paper from the printing cylinder to the board *r*, (see the arrows) where it is discharged with the printed side upward. The endless tapes which conduct the paper to the printing cylinder, return round the rollers *s*, and *t*, (see the returning arrows); there is therefore three tapes which pass under the printing cylinder, over the rollers *s*, and round the rollers *u*, where the ends are also made fast, and on which they wind alternately, as the printing cylinder revolves to and fro; which tapes are kept to a proper degree of tension, by means of a pulley, line and weight, on the opposite end of the rollers; which line winds on as the tape winds off, and vice versa. These tapes are for the purpose of receiving the sheet from the endless tapes, of wrapping it round the periphery of the cylinder, while it receives the impression, and of conducting it out at the opposite end. There are besides, three endless tapes which pass round the printing cylinder and the small pullies *v*, which are for the purpose of parting the printed sheet from the cylinder, and of introducing it between the rollers *q*, with their endless tapes, to be conveyed to the receiving board *r*.

" The second part of my invention, is represented by the diagrams, figs. 2, 3 and 4, the same letters denoting the same parts in each; *a*, *b*, *c*, and *d*, represent four printing surfaces, with the power *e*, applied between them, the only piece of framing here represented, is for the purpose of showing what is meant by the upper and under surfaces, *a*, and *d*, being fixtures during the impression, one form of type *f*, is laid upon the under surface *d*, and the other form g, upon the intermediate surface *b*, the intermediate surfaces *b*, and *c*, have perpendicular guides *h*, to prevent side deviation, and are suspended on levers *i*, (see fig. 3.) so as mutually to act as a counterbalance to each other: the upper surface *b*, having rather the preponderance. They are also each provided with four flat bearings *k*, against which the rollers *l*, of the power *e*, are intended to act. The power represented at *e*, is two shafts *m*, with projecting arms and rollers *l*, (see fig. 4), which are connected by the wheels *n*; it will therefore be obvious, that if either of the wheels be forced round by means of a lever or otherwise, the two intermediate surfaces *b*, and *c*, will be pressed with equal force in opposite directions, as power and resistance, so that two impressions will be obtained with the same expense of time and power as is necessary in the ordinary way to obtain one.

As there is some novelty in the method which I purpose to adopt, for passing the paper from one form to the other, &c. I shall first state, that the cylinders *o*, and *p*, have an endless web of thick machine cloth (being single on the impression) passed round them, encompassing the upper surface *a*—The cylinders *q*, and *r*, have a web of thin cloth (being double on the impression) passed round them with the double passing between the surfaces *c*, and *d*; the upper part of which cloth is brought down to its proper level by the rollers *s*.

There are also endless tapes, in number corresponding to the margins in the forms, passed over the cylinders *o*, *p*, *t*, *u*, *v*, and returned under *q*, through between the surfaces *c*, and *d*, up round *r*, through between the surfaces *a*, and *b*, and up round the feeding roller *w*. There are besides a corresponding number of tapes passed round the cylinders *x*, *q*, *r*, going through between the surfaces *a*, and *b*, and returning between the surfaces *c*, and *d*; the cloth and tape are intended to pass sufficiently close to the under side of the surfaces *a*, and *c*, to allow the inking rollers to pass, it being intended to ink without moving the surfaces on which the forms lay.

"The paper is supplied from the board *y*, in any of the usual ways, and by one revolution of the cylinder *q*, a sheet is brought in between the surfaces *a*, and *b*, by means of the endless tapes and cloth. A second revolution brings it round to the back of the cylinder *r*, whilst a second sheet fills up the place of the first. A third revolution brings the first sheet between the surfaces *c*, and *d*, and a third sheet between the surfaces *a*, and *b*, and after every revolution of the cylinder *q*, an impression is taken as before described, and the paper is successively discharged on the receiving board *x*, printed on both sides.

"The improvements contained in these diagrams, and herein described, which are intended to be secured under this patent, have no respect to any particular kind or construction of feeding apparatus, inking apparatus, delivering apparatus, power for giving the impression, or any other movement, further than has been stated above, namely, the adaptation of four feeders to one printing cylinder and surface, and the application of power for giving the impression centrally between four surfaces and two forms of type, the outer surfaces being fixtures during the impression."—[*Inrolled in the Inrolment Office, in Chancery, Dec.* 1828.]

Specification drawn by the Patentee.

To WILLIAM POOL, *of the Parish of St. Michael on the Mount, in the city of Lincoln, Smith, for his having invented certain improvements in machinery for propelling vessels and giving motion to mills and other machinery.*—[Sealed 26th May 1829.]

SPECIFICATION.

"These improvements in machinery for propelling vessels, and in giving motion to mills and other machinery, consist in a peculiar mode of turning and guiding rotatory paddles or float boards, mounted in their carrier wheel upon horizontal axles, which improvements are designed to enable them to enter into and pass out of the water edgewise.

"The disadvantages attendant upon the employment of the ordinary fixed radical paddles, both for propelling and for undershot water wheels, by their pressing upon the surface in entering the water, and being impeded by lifting the back water in quitting it, are so well understood by engineers that it is unnecessary to point out the theoretic defects of their construction.

"The Patentee has adopted in connection with his improvement, square or oblong paddles attached to the rims of the carrier or paddle wheel, by means of an axle crossing the middle of each paddle, and its pivots bearing and turning in the rim of the wheel near its periphery.

" The improvement consists in affixing to the end of the axle of such paddle a lever, with a boss or stud, near its extremity, which boss or stud is intended to act in an excentric cricular groove made stationary at the side of the vessel, or affixed to the frame work of the mill or other machinery. By means of these studs or bosses near the extremities of the levers traversing in the excentric groove as the carrier wheel goes round, the paddles are respectively turned upon their axles at certain parts of the rotation of the wheel, by which contrivance the paddles are made to descend into the water edgewise in nearly perpendicular positions, and after making the propelling stroke at right angles to the surface of the water rising, edgewise out of the water in the same position, and thereby avoiding the resistance to which the ordinary radial fixed paddle is exposed, and consequently acting with considerably increased effect.

" Plate I, fig. 2, is a side view of a propelling wheel, with the improvements adapted thereto. Fig. 12, is a front view of the same; *a, a,* is the beam or bearing affixed to the side of a vessel, or to the frame work of a water mill, on which the axle of the carrier or paddle wheel is supported and turned; *b, b,* are the plummer blocks ; *c,* the axle of the wheel ; *d, d, d, d,* the rims of the wheel, carrying the paddles ; *e, e, e, e,* are the axles of the paddles, the pivots of which turn freely in the rims *d* ; *f, f, f,* are levers affixed to the ends of the axles *e,* with a stud or boss, at the extremity of each lever ; *h, h,* are two rings connected together by loops or staples, and forming the groove for the bosses or studs of the levers to act in, as the carrier wheel goes round.

These rings are securely fixed to the side of the vessel, or to the frame work of the mill, in a situation excentric to the axle of the carrier or paddle wheel, and by means of the studs or bosses guide the levers, so as to confine the paddles in every part of their course to the desired positions.

Having described the construction of a wheel for propelling ships, boats and other vessels on water, with the improvements attached thereto, the Patentee deems it unnecessary to particularise the variations which might be required in adapting the same contrivances to the wheel of an undershot water mill, as his claim of novelty and improvement consists in the following particulars, viz. the attachment of a lever to the axle of each paddle, with a stud boss or anti-friction roller acting in and confined by a fixed excentric channel or groove formed by rings, or by any other means that might be found desirable.—[*Inrolled in the Petty Bag Office, July,* 1829.]

To JOHN NICHOLLS, *of Pershall, in the County of Stafford, Gentleman, for his Invention of certain Improvements in the Lever, and the application of its Power.*—Sealed, 25 July 1829.

THE subject of this Patent is founded on one of those mistaken projects for obtaining power by compound leverage, which so often emanate from persons unacquainted with the true principles of mechanics. We give the explanation in the words of the Patentee.

SPECIFICATION.

"MY said invention of improvements in the "Lever and the application of its power," consists in applying weights to the opposite sides or ends of a lever suspended at the centre, (the centre of gravity being below the point of suspension) so as when acted upon to produce a vibratory or oscillating motion, which may be applied like any other force or power to the moving of machinery or other useful purposes, where force is required. The construction is represented in Plate III, figs. 1 & 2. This lever may be made of cast iron or any other suitable material, and may be of any given form or dimensions, as to its length, breadth or thickness at certain given points. Near each end I attach weights, as represented in the drawing, or I so form the arms of the lever as to act themselves as weights. These weights are placed in such a position as to balance each other, and at a given distance below the line of the axis of motion, and by the alternate elevation and depressi on of each end in succession, I obtain a vibratory action, by which an accession of power is obtained. I find, by experiment, that when the lever is 5¼ inches from the axis of suspension to the centre of the weights, that the line of the centres of the said weights, should be about fifteen one-eighth or thirteen one-fourth of an inch below the centre of the axis of suspension, making an angle with the centre of about sixteen degrees. I also find, that it is beneficial for the improved lever to have an elevation above the axis, of about two and three-quarter inches, and of about four and a half inches above the line of the centres of the weights, making an angle with the centre of about 25 dgrees. The suspended weights which I have applied in these applications, are about 2lbs. each, and the vibratory action of the lever about 36 vibrations, or double strokes, per minute. These lines of construction, and iven dimensions, and the statement of weight, as applied in practice, I lay down and recommend as general data, for the proportional construction of all apparatuses on a larger scale, and which I consider as best adapted to obtain the most effective power from the application of my said improved lever. But I do not confine myself to any particular form of construction, or to hese proportions, for if a greater speed is required, I use larger or heavier weights, and if a slower speed is wanted, I use lighter weights, and adapt the construction of the improved lever and its machinery, to the object to which it is intended to be applied.

" I now proceed more particularly to describe the nature of my said invention and improvements; figures 1 and 2, are geometrical elevations and side views of the two sides of the improved lever, showing the application of its power to move nachinery and other useful objects, to which the said improvenents may be found applicable *a, a,* in, each figure represent ne side of the improved lever, which may be made of wood or f cast iron, or of any other suitable material; *b, b,* are weights ttached to each end of the lever, which should be equal or early so; *c* is the axis on which the lever *a, a,* is suspended; , *d,* are columns of cast iron or other suitable material, which upport the improved lever; *e,* is a crank or lever fixed firmly n the axis *c,* and moves with the lever; *f,* is a connecting rod, hich joins or connects the crank *e,* with the crank *g,* on the axis ; *i, i,* is a wheel fixed on the axis *h,* which operates upon, and oves the pinion *k, k,* which is firmly fixed on the axle *l*; *m, m,* a fly wheel, also fixed to the axle *l*; *n,* is an iron pin to which rope *u,* is attached, for the purpose of putting in motion the nproved lever and suspended weights; *o, o, o, o,* are stays or races, which connect each side of the suspended lever firmly ogether; *p, p, p,* are frames of cast-iron or other material, nade to support the wheel *i, i,* and the pinion *k, k,* and their xis *c,* and *h.*

Figure 3, represents a sectional view of the suspended lever; , *a, a, a,* represents the wood on cast iron sides; *b, b,* the lead r iron weights; *e,* the crank on the axis; *c, c, c,* the axis of e improved lever; *o, o, o, o,* the stays or braces, by which the des of the lever are firmly held together.

" Figure 4, represents a sectional view of the frame *p, p, p, p,* on which the fly wheel *m, m,* on the axis *l,* and the pinion *k, k,* rest, and are supported, also the wheel *i, i,* on the axis *h,* on which the crank *g,* is fixed. The improved lever and machinery herewith connected, and which have been herein described, may be put in motion by any power acting upon it in such manner as to produce a vibratory action on the end of the lever *a, a,* &c. For instance, a pulley and ratchet wheel, may be attached to the frame *p, p,* which being caused to act with sufficient force on the end of the lever at *n,* through the medium of a rope or any other connecting means, a depression at one end of a lever will occur, and the gravity of the weights will instantly produce an effort to regain an equilibrium : and the effect will be a vibratory action or motion of the improved lever ; which operation being repeated, a rotatory movement of the machinery may be produced, and the power thus obtained, applied to useful purposes. Thus motion may be communicated by the force of a man acting directly upon the rope *u,* by a pull downwards, or in any other convenient mode, by which the vibratory action will be communicated to the improved lever *a, a,* and suspended weights *b, b,* which will operate by the axle *c,* upon the crank *e,* communicating motion by the connecting rod *f,* to the crank *g,* and the axle *h,* to the wheels *i, i,* which operates upon, and moves the pinion *k, k,* fixed on the axle *l,* and the fly wheel *m, m,* being thus put in rapid motion, will enable the crank *g,* to pass the line of centres or neutral points, and the motion and power thus originated by the action of the improved lever and weights, may be communicated to a corn mill or any other machine or machinery requiring rotary motion. The power originated by the vibratory action of the improved lever and weights, may also be advantageously applied to working pumps and many other useful purposes, which will be obvious to every practical mechanist. Having thus described my improvement generally and particularly, and having given an example of the mode of constructing my said invention of the improved lever, and the particular details of the application and manner of operation by which the power of its vibratory action may be communicated to machinery, and by which description and drawings any competent mechanist may construct or manufacture, and apply the same to useful purposes, I proceed to state my special claims to the invention of the improvements herein described, and the application of their power

"First,—I claim as my invention, the application of the vibratory motion of suspended weights acting on opposite sides or ends of a lever, having a common axis to the production or application of force as a moving power, as herein described.

"I claim as my invention, the described application of the improved lever, and of the mechanical power originating from the vibratory motion of suspended weights, acting as aforesaid under any other similar form of construction, by which the same can be manufactured, produced and applied; but I do not claim the wheels, cranks or axis, or any other mechanical apparatus in common use, as any part of my invention, except in connection with the construction of the 'improved lever, and the application of its power.'"—*Inrolled in the Inrolment Office in Chancery, Sept.* 1829.

Specification drawn by Mr. Rayner.

The following observations on this invention are forwarded by a Correspondent:—

"The Patentee has availed himself, in this case, of that property or disposition in matter to a state of rest—termed the inertia of matter—to obtain a force or power, which he purposes to apply to various useful purposes.

"The vis inertiæ of matter (or power of inactivity) has been defined by Sir Isaac Newton to be a power implanted in all matter—by which it resists any change to be in a state of rest, and by which when disturbed it endeavours to recover that state of rest to which it naturally tends.

"In the construction of the improved lever the Patentee places the suspended weights below the axes of motion, and at the extremities of the arms of a lever of considerable length. By acting upon the end of the lever, the position of the weights is deranged, and the force of inertia combined with the gravity of the weight operates to restore that rest and equilibrium which has been disturbed, and the successive alternations, are presumed so to operate in the action of the lever, that a force will be originated which may be applied advantageously to move machinery, and to other objects where power is required.

"A series of well conducted experiments appear needful to perfect this invention, and to place the improved lever before the public in a shape not to be questioned by the cavils of objections."

To Augustus Applegarth, *of Crayford, Kent, printer, for improvements in Block printing.*—[Sealed 26th January, 1828.

These improvements apply principally to the printing of shawls or square handkerchiefs of silk or cotton, and consist, first, in the construction of a suitable bench or table for laying out a piece or length, of the material to receive the impression of the blocks; and, secondly, the construction and mode of applying the blocks for giving the impression.

Plate III. fig. 6, represents a plan or horizontal view of the table. Fig. 7, an end elevation of the same. The table is placed upon brick work or other solid foundation, and consists of flat stones, *a, a,* each, equal in size to the square of the shawl or handkerchief to be printed; over these the felt or blanket is to be spread and stretched tight by tenter hooks on the sides, and by rods placed across the table, and held down between each stone by hooks or staples.

Upon the blanket so fixed the length of the piece of silk or cotton is extended and confined in a similar way to the blanket, the frame *b, b, b,* which turns upon hinges at *c, c, c,* is then shut down over the table as seen at fig. 6, by which the piece is divided into suitable squares for printing shawls or handkerchiefs.

If the pattern of the shawl or handkerchief is intended to consist of four corner pieces, as in the first square compartments of the table, then a block *d,* is to be employed fitting exactly one fourth of the area of the square, on which block the pattern of one fourth of the shawl with the corner of the design is to be engraved. The block being very carefully placed close against the angle of the frame as in the second compartment, four repetitions of the impression perfect the design.

If a border only is intended to be printed round the edge of the shawl, as shown in the third compartment, then a block with a pattern is prepared extending along one side as at *e.* If a centre piece alone, as at the fourth compartment, is to constitute the subject to be printed, then the frame must be divided by cross pieces as in the fifth compartment, and the block introduced into the centre, fitting the space exactly.

It is obvious that in this way any pattern may beprinted, and several persons may be employed at the same time upon the table, the colouring or inking of the blocks being performed in the usual ways, and when one length of the material has been completed, the frame being raised, allows the finished portion to be drawn off, and another length placed upon it in like manner to be printed in the same way.—*Inoolled May,* 1828.

REVIEW OF BOOKS.

Natural Theology, forming part 2, *of the Library of Reli-gious Knowledge*, 1 .mo. 1829.

All our readers must have heard of Paley's Natural Theology, indeed it has found a place in almost every library, and yet it abounds in faults both of science and theological illustration. Neither is the present work altogether free from censure on the latter score, though that is a department with which we have little to do. The science is, however, excellent, the reasoning clear and logical, and the arrangement of the subjects as good as could have been adopted. One or two extracts will show that we have not over praised this cheap and valuable little work. "We may commence with showing how the circulation of the blood serves to convey the nutrimental part of our food to every portion of the body, and it will be necessary to remind the reader, that the circulating system consists of a heart at the centre, and of blood vessels, which, as it were, grow out of the heart in large trunks, and then send out large branches, called veins and arteries, which divide and subdivide till they at last become as small as hairs.

"These are so thickly spread over the whole body that we cannot prick the point of a needle into any part of the flesh without drawing blood; that is, without pricking a a blood vessel. They enter into the substance of even the bones themselves.

"Now *the course of the nutriment* is as follows:—In the mouth, as we know, it is ground down and mixed with the saliva. It then descends down a wide passage, and falls into a bag or pouch, called the stomach, situated in an inclining position across the chest.

“There it meets with a liquid, called the *gastric juice*, which is *secreted*, that is, *separated from the blood*, by the glands situated in the internal coat of the stomach.

“By the action of this powerful solvent it is reduced still further into a sort of thick grey pulp, which is called *chyme*.

“The stomach, by a tremulous, undulating motion, empties its contents, thus altered, into a large intestine, which is, in fact, only a continuation of the stomach itself, called the *duodenum*. In its passage through the bowels the *milky* or *nutritive* part of the mixture becomes entirely separated from the *grosser* part, either by the action of the bile, which is poured upon it as it passes through the duodenum (which was the opinion held till lately), or by its being *attracted by the inner coat of the bowels*, which is supposed to possess the curious property of making the selection. (The latter account is a recent discovery.) Be this as it may, the *milk-like* fluid is in this stage of the process called *chyle*. Along the whole course of the intestines, which in a man are about thirty-two feet in length, myriads of *tubes*, called lacteals, present their mouths, and absorb the chyle as it passes over them.

“These tubes, which are so small as scarcely to be visible unless when full of chyle, soon unite into larger branches.

“The pipes formed by this union terminate in glands from which still larger pipes arise, and carry the chyle, thus collected from all parts of the intestines, into a common reservoir or receptacle.

“This reservoir holds about two table-spoonsful, and from this vessel a main pipe or duct proceeds, climbing up the back part of the chest, then creeping along the gullet, till it reaches the neck. Here it *empties itself* into a large *vein*, which soon carries the chyle, now *mingled up* *with the old blood,* to the *heart,* and thence it is distributed through every, even the minutest vessel in the whole system. Thus the food which we take in at an aperture of the body is distributed to every nook and corner of it. What we receive with our mouths finds its way to the fingers' ends; which was the *first use* of the circulating system we proposed to explain.

" While we are upon the subject, we may be permitted to make a few observations respecting that part of the *contrivance,* also, which *serves to convey the nutriment.*

" This immense length of intestines is superfluous, considered simply as a *passage*; but the most evident design is beheld in it when considered as allowing more *time* and *space* for the *extraction of the chyle,* which if not taken up by the lacteals or minute tubes in one part, may be taken up by those of some other part.

" The next observation is, that since it was of the utmost importance that the lacteals should take up nothing but *chyle,* it was necessary that they should be exceedingly fine and slender: yet if it is also necessary, which it *is* in the human frame, for them to extract as much as three of four quarts in a day for the support of the body, their *smallness* must be made up by their *number*; and accordingly, their number is *incalculable.*

" Again, *that tube* or *duct,* which we have described as conveying the chyle from the reservoir, in order to empty it into the blood, being *straight,* and being furnished with no force to propel its contents, it contains a succession of *valves* or doors, all opening one way, that is, upwards.

" While the chyle continues in the *ascending direction,* these valves offer no resistance, but lie back upon the side of the tube. On the contrary, whenever the chyle attempts to *descend,* for the want of sufficient force to push it on, the valves are thrust out from the side of the vessel by the chyle getting behind them, and are shut down. Thus the chyle itself is made to prevent its own escape.

"Can it be doubted whether the great length of the intestines is precisely adapted to the office and size of the lacteals? Are not these valves strictly mechanical contrivances, both as it respects their use and construction?

"But the *second use* of the circulation is *to carry a supply of material, for secretion or separation,* to the liver, the kidneys, the stomach, and to every other part of the body which is furnished with glands. It is true that secretion is a process which is but imperfectly understood; but its *importance* is clearly attested in the human frame by the circumstance, that a single secretion being wrong is often enough to make life miserable, and even sometimes to destroy it.

"We can also clearly distinguish the *result,* which we call *the secretion,* although the mode by which it is produced may be entirely concealed from our enquiries.

"What we know of the subject is this:—We see the blood carried by a pipe or duct to little round bodies which we call glands, and in which the secret, whatever it may be, seems to reside. We see a *part* of that blood, after having undergone the action of the gland, coming out of it by another pipe; and at the same time we see a totally new and dissimilar substance coming by a third pipe from the gland. This last material we call *the secretion.*

"Now when it is considered that from *one and the same blood* so many *dissimilar* substances are secreted, for instance, the tears which keep the eye moist, the saliva which is spread over the seat of taste, the viscid substance which defends the ear, the slippery liniment which keeps the joints supple, the powerful solvent in the stomach which digests the food, the second use which was assigned to the circulation is sufficiently obvious. Unless these different glands *are supplied with blood*, from which they separate these various substances, they would no longer be deposited in the places where they serve such invaluable uses."

French Patents

Continued from Vol. III. page 338.

To Mr. Denis François Pouchin, residing in Paris, Rue d'Ecole, for 5 years, for an invention and improvement to scour cloths, casimeres, and all other stuffs capable of being scoured, with indestructible preparation, and without creases. 23d April.

To M. André Delcourt, manufacturer, residing in Paris, Rue Neuve Saint Croix, for 5 years, for an invention and improvement to break hemp and flax. 23d April.

To Messrs. André Delcourt, manufacturer, and Van de Weigh, mechanic, residing in Paris, Rue Neuve Sainte Croix, for 10 years, for a machine to heckle hemp and Flax. 25th April.

To M. Charles Antoine Thiébant, founder, residing in Paris, Rue Faubourg Saint Denis, for 10 years, for an invention for casting and making hollow rollers of brass, and a composition of copper and other metals. 25th April.

To M. Alexandre François Selligue, engineer and letterpress printer, residing in Paris, Rue des Jeaniers, for 5 years, for the invention of a rolutive printing press of two eccentric cylinders, and capable of receiving any moving power. 25th April.

To Messrs. Marcellin, Legrand, Plassan and Co. residing in Paris, Rue du Petit Vau Girard, for 5 years, for improvements in casting types by the polgamatyp process, invented by M. Henri Didot. 25th April.

To M. André Louis Edouard Hirier Bonnefont de Puycousin, sojourning in Paris, in the school of M'Guilleman, Advocate of the Court of Cassation, residing at the place Sainte André des Arcs, for 10 years, for an improvement on a patent granted December 11th, for a method which he calls "instantaneous technigraphy," to teach in six hours the orthography of 40,000 words, most usual in the French language. 27th April.

To M. Louis Roth, residing in Paris, Rue d'Enfer, for a second patent and improvement on a patent granted Nov. 22d, for an apparatus and method to evaporate and boil syrups without injuring them. 27th April.

To Messrs. Vérité and Moisset, merchants of Beauvais, represented in Paris by M. Bezet-Sellier, grocer, residing Rue de la Michaudière, for 10 years, for a method of printing from engraved and carved plates, on every kind of woollen cloth, even on carpeting, all designs of one or many fast colours. 27th April.

To M. Adrian Joseph Dupeuty, residing in Paris, Rue d'Enghien, for 5 years, for a cane which he calls *baguedrandine*, for both fan and screen. 27th April.

To M. Maurice Daninos, merchant, residing in Paris, Rue de Faubourg Poissonnière, for an improvement on a patent granted Feb. 7th, for finishing men and women's hats of cotton, and in unplatted thread, imitating Italian straw, equally light and perfectly waterproof. 27th April.

To Messrs. Touron and Co. represented in Paris by M. Coreille, Rue de Tournelles, for 5 years, for a method of printing on hair-cloth fast colours. 27th April.

To M. Antoine George, of Lyons, represented in Paris by M. George, builder, Rue Papillon, for 5 years, for a machine to mix and prepare earths for pottery. 28th April.

To M. Jean Boitin, cutler, Paris, Rue Favart, for 5 years, for a razor strop. 28th April.

To M. Charles Louis Petit, mercer, Paris, Rue Saint Denis, for 5 years, for an instrument which he calls "filière," to thread needles. 28th April.

To Messrs. Parent and Vallet, clockmakers, Paris, Rue de l'Arbre Sec, for 5 years, for an instrument which he calls "coupe-mèche," to cut the wicks of lamps. 28th April.

To M. Augustin Hatan, Paris, Place Royale, for 5 years, for a new form of a carriage, which he calls "imperial ogive," 28th April.

To M. Jean Palle, mechanic, Saint Etienne, department of the Loire, for 5 years, for an escapement loom lathe, which he calls "à la palle," to be employed in the manufacture of silk ribbons. 28th April.

To M. André Millet, fire-grate maker, Paris, Passage Saulnier, for 5 years, for an improvement of portable fire-grates. 29th April.

To M. Garçon Malar, Paris, Rue Taitbout, for 15 years, for a cylindrical mill. 29th April.

To the anonymous Royal Society of Savonnerie, represented by M. Camille Beauvais, manager, Paris, Quay de Billy, for 5 years, for an apparatus to variegate colours. 30th April.

To M. Philippe Taylor, civil engineer, Paris, Rue du Faubourg Saint Martin, for 10 years, for an improved windlass. 30th April.

To M. Antoine Léopold Chéradame, merchant, Paris, Boulevard des Italiens, for an improvement on a patent granted Dec. 13th, for 15 years, for a new method of illuminating. 1st May.

To M. Jean Baptiste Godart, engineer of Amiens, department of the Somme, for 10 years, for a machine to clean hemp and flax, and finish its preparation. 1st May.

To Messrs. François Meyet and Jean André Vallat, mechanics, of Saint Etienne, department of the Loire, for 5 years, for a loom lathe, for the manufacture of figured and open-worked ribbons. 1st May.

To M. César Louis Oudinot Lutel, Paris, Rue du Faubourg Poissonnière, for 10 years, for a hair cloth, which he calls " tissu crinière. 1st May.

To M. César Louis Oudinot Lutel, Paris, Rue du Faubourg Poissonnière, for 10 years, for the application of hair-cloth to wearing apparel. 1st May.

To Messrs. Bouveret, mechanic, and Cordier, professor of music, Paris, Rue Saint Denis, Passage Basfour, for 10 years, for an harmonical flute. 10th May.

To Messrs. François George Hyacinthe and François Levavasseur, brothers, manufacturers, Paris, Rue Montmorency Saint Martin, for 10 years, for a new lamp burner, which he calls " bec à bouchon superposé." 7th May.

To M. Ponce de Paul, director of the clock manufactory of Saint Nicholas d'Haliermont, Paris, Rue de la Barillerie, for 5 years for different instruments in clockmaking. 8th May.

To M. Jean François Gustave Mallat, living at Puy, department of the Haute Loire, for 15 years, for an expeditious and cheap earth borer. 8th May.

To Messrs. Raingo, brothers, clockmakers, Paris, Vielle Rue du Temple, for 5 years, for many improvements in pendulums. 9th May.

To M. Maelzel, mechanic, of the United States, represented in Paris by M. Wagner, clock-maker, Rue du Cadran, for 5 years, for an instrument, which he calls " métronome. 9th May.

To M. Auguste Dubrunfaut, professor of chemistry, Paris, Rue Pavée, au Marais, for 5 years, for the application of sulphuric acid and sulphate to beet-root, for the production of crystallized sugar. 11th May.

To Messrs. Dumont, brothers, Pont de Bordes, department of Lot-et-Garonne, for an improvement on a patent granted the 10th of February, 1826, to them in conjunction with

M. Poitevin, for 10 years, for a distilling apparatus. 15th May.

To M. Godin, manufacturer, Petit Bagneux, department of the Seine, for 10 years, for a machine, which he calls "métro-bare," to weigh carriages. 15th May.

To M. l'Epine, Paris, Rue Saint Lazare, for an improvement on a patent for 10 years, granted the 30th of Oct. 1827, for a portable apparatus for lighting apartments, manufactories, workshops, &c. by hydrogen, gas from the heat of any kind of grates. 16th May.

To M. Ambroise Michael de Saint Denis, literary man, Rue du Loup, Bourdeaux, department of the Gironde, for 5 years, for a method, which he calls "sonography," of writing more correctly and expeditiously than stenography. 16th May.

To M. Auguste Haton, Paris, Place Royale, for 5 years, for a carriage, which he calls "pyrum-rotans." 16th May.

To M. Pierre David, mechanic, Côte Saint Sébastine, No. 1, Lyons, department of the Rhône, for 10 years, for a cheap machine to wind silk, either simultaneously or separately, either for bobbins or shuttle-canes. 25th May.

To M. Bernard Romain, instructor, Bagnols, department of the Gard, for an improvemnt on a patent granted February 5th, for 10 years, for a method which he calls "graphiamalégy," for teaching to read and write at the same time. 25th May.

To M. Roche, manufacturer, Saint Etienne, for an improvement on a patent to him jointly Olagnon, sen. granted the 25th of November, 1828, for 5 years, for a roller for ribbon-making. 25th May.

To M. Van Houtem, merchant, Paris, Rue de Tracy, for 5 years, for a cylindrical box to grate sugar. 25th May.

To Messrs. Joseph and Claude Guyon, brothers, locksmiths, Dôle, department of Jura, for 5 years, for a kitchen stove. 25th May.

To Miss Caroline Descroizilles, sojourning at Paris, M. Gardin's, Rue Hautefeuille, for 5 years, for an apparatus to baste tissues without pneumatic and ventillating pumps. 25th May.

To Messrs. Oudet and Arnaud, mechanics, Saint Etienne, department of the Loire, for 5 years, for a roller, which they call "battant brocheur," for weaving ribbons from many shuttles. 25th May.

To M. Hervieu, refiner, Nantz, department of the Loire Inférieure, for 10 years, for a new refining filtre. 25th May.

To M. Auguste Touron, cutler, Paris, Rue de Richlieu, for 5 years, for a fixed and moving cylindrical instrument to sharpen razors. 28th May.

To M. Bronzac, iron master, Paris, quay Voltaire, for 15 years, for an apparatus which he calls "a moveable fire-grate." 28th May.

To Messrs. Burnot, Pionnier, Decrouy et Botherel, Paris, Rue Papillon, for 15 years, for a method of burning plaster of Paris by means of hydrogen gas, and purifying coal without any other combustible, and pulverising it. 28th May.

To M. Jean Pierre Valdeiron, Rue Silvabelle, Marseilles, department of Bouches-du-Rhone, for 5 years, for a syphon, which he calls "à écoulement perpétuél," for watering land from pits on sloping ground, and for making jet d'eaux. 28th May.

To M. Alexandre Lefranc, goldsmith and jeweller, Paris, Rue Taithout, for 5 years, for a coffee-pot with a chafing-dish, which he calls "cafetiere Lefranc." 28th May.

To M. Haetjens, merchant, Paris, Rue d'Echequieur, for an improvement on a patent granted 19th August 1828, for 5 years, for a machine which he calls "porte-encre auxiliaire, ou porte-couleur auxiliaire," for supplying ink to printing press, and colours to every other impression on stuff and paper. 28th May.

To M. Frederic Athanase Lebreton, Bel Air, Commune de Gentilly, arondissement de Seeaux, department of the Seine, for 5 years, for a composition to dcstroy ants. 29th May.

To M. Folquin Françoix Leclerc, Paris, Boulevard du Temple, for 5 years, for a machine to clean and black shoes and boots. 30th May.

To M. Pierre Louis Nicolas Conquerant, physician, Coutances, department de la Marche, for 15 years, for a series of safety cocks for liquors and gas, and for a new gauge to measure the contents of casks. 30th May.

To M. Antoine Leopold Cheradame, merchant, Paris, Boulevard des Italiens, for an improvement on a patent for 15 years, dated 13th December preceding, for a new method of lighting. 30th May.

To M. Alexandre François Selligue, engineer, Paris, Rue des Jeuneurs, for 5 years, for a kneading trough. 2d June.

To M. Eugene Garnier, mechanic, of Boubers, represented in Paris by M. Garnier, Rue de Bourbons, for 5 years, for a machine for making ices. 2d June.

To M. Antoine Dominique Jisco, locksmith, Paris, Rue Lepellier, for 5 years, for an instrument which he calls "monte-ressort-boîte," containing all the utensils to mount and dismount fire-arms. 4th June.

To M. Segundo, represented by M. Mans, librarian, at Termes, near Paris, Rue des Acacias, for an improvement on a patent for 10 years, dated 30th October 1829, for curbs and bits for horses. 5th June.

To M. Paul Planchet, mechanic, Saint Etienne, department of the Loire, for 5 years, for a roller for making silk ribbons. 5th June.

To Messrs. Pitray and Viel, merchants of Charlestown, represented in Paris by Messrs. Perrier, brothers, Rue Neuve de Luxembourg, for 15 years, for a rice-mill. 5th June.

To M. Roth, Paris, Rue d'Enfer, for 15 years, for an apparatus to evaporate and prepare syrups without injuring them. 5th June.

To M. John Udney, Paris, at M. Daniel Glashin's, Rue Vivienne, for 5 years, for a new steam machine. 5th June.

To Messrs. Thilorier, senior and junior, and Barrachin, Paris, Rue du Bouloy, for an improvement on a patent for 5 years, dated 12th May 1826, to M. Thilorier, senior, and prolonged, June 6, 1827, to 15 years, for a lamp called "hydrostatique à réservoir inférieur," to replace that called "à la Carcel," without any wheelwork or moveable piece; and secondly, for an improvement on a second patent for the same purpose to the 9th June.

To M. Joseph Goetz, merchant, Paris, Rue Jean Jacques Rousseau, for 5 years, for an apparatus to ferment beer. 9th June.

To M. Flury Douzel, manufacturer, sojourning with Messrs. Elizée Devillas and Co. Lyons, department of the Rhone, for 15 years, for a reverberating furnace, either by wind or draught, for vitrifying without moveable earthen plates. 9th June.

To M. Jean Francis Lambert, mercer, Paris, Rue des Grands Augustins, for 5 years, for a machine to tag laces. 12th June.

To Mrs. Rondet, alias Marie Louise Cheon, midwife, of the office of charity of the tenth arondissement of Paris, Rue du Four Saint Germain, for 5 years, for an instrument for blowing air into the chests of fresh born children. 12th June.

To M. Lexcellent, comb-maker, Paris, Rue de Montmorency Saint Martin, for 5 years, for a method of rendering horn elastic. 12th June.

To M. Antoine Perpigna, represented in Paris by M. Feron, joiner, Rue Saint Nicholas d'Antin, for 5 years, for a method of brick making. 12th June.

To M. Louis Joseph Salmon, chemist, Paris, Rue de Ménilmontant, for 5 years, for a method of producing a new manure. 13th June.

To M. Edouard Petersen, Strasbourg, department of the Bas Rhin, for 5 years, for a universal steam mover. 13th June.

To Messrs. Orry, engineer, and Houssaye, merchant, Paris, Rue Hauteville, for 5 years, for a couch indicator. 13th June.

To M. Jean Antoine Marie Collembet, professor, Paris, Rue

Vivienne, for 15 years, for a method of teaching to write at the same time as pronunciation and orthography. 13th June.

To Messrs. Rondeaux and Henne, pasteboard-makers, Bonpuits, La Chapelle Saint Denis, department of the Seine, for 15 years, for a method of making pasteboard and paper of old leather, which they call " water-proof and common leather paper and pasteboard. 13th June.

To M. Joseph Delemontex, mechanic, Paris, Rue Simon-le-Franc, for 5 years, for a turning wheel to make cylindrical screws. 13th June.

To Messrs. Eno-Salmon, merchant, Paris, Rue Neuve Sainte Eustache, and Yoart Pavie and Jourdain, manufacturers, Rouen, for a furniture stuff with both sides of different colours. 15th June.

To M. Giroudot, engineer, Paris, Rue du Val-de-Grace, for 5 years, for a machine to cut paper. 15th June.

To Messrs. Irving and Morson, Paris, the former at M. Kinson's, Rue Richelieu, and the latter at M. Lafitte's, Rue d'Artois, for 10 years, for a weighing machine. 16th June.

To Messrs. Berthaut and Bourlon, Paris, at Messrs. Dumondier and Goufard, Rue Montmartre, for 5 years, for a machine which they call " accelerator," for carriages. 16th June.

To Messrs. de Mundel and de Sallier Dupin, Nantz, and Paris, Rue de Colombier, hotel d'Espagne, for 5 years, for a method of making china mother-of-pearl. 17th June.

To M. John Byrne Madden, Passy, near Paris, quay of Poissy, for 15 years, for an apparatus to give motion to stagnant water, without raising the water above its natural level, or to artificial rivulets, with the least possible loss of power. 17th June.

To M. Ferdinand Favre, painted calico maker, Nantes, department of the Loire Inferieure, for 5 years, for carding and stuffing machines of rotatory and alternate movement to card, stuff, and finish dimity and fustian, called Nantes cotton, and other stuffs. 17th June.

To M. Teste Laverdet, locksmith, Saint Saulge, represented in Paris by M. Laverdet, Rue du Contrat Social, for 5 years, for a hand-mill to shell french beans.

To M. Godin, manufacturer, Petit-Bagneux, department of the Seine, for 15 years, for a carriage which he calls " messagerie economique. 19th June.

To M. John Dixon, merchant, Benfield, department of the Bas Rhine, for 5 years, for a machine which he calls " ourdis, soir-aunometre," for warping and measuring cotton, linens-woollen and silk thread, &c. 19th June.

To M. Joseph Marleix, collar-maker, Rue Saint Dominique, Lyons, department of the Rhone, for 5 years, for a collar, which he calls "col marlaide," made of rabbits, chamois, castor, &c skins. 20th June.

To M. Galy Cazalat, professor of physic, Paris Rue Croix des Petits-Champs, for 10 years, for an ærostatic lamp for completing the lighting system with pure water, air, and oil. 22nd June.

To M. Frigerio, apothecary of the lying-in house, Paris, Rue de la Bourbe, for 5 years, for an apparatus and process of disinfecting privies of foul air. 24th June.

To M. Nicholas Houzeau, apothecary, of Rheims, and of Paris, Rue de Courcelles, for 10 years, for a new system of carrying gas. 24th June.

To M. Wattebled, engineer, Paris, Rue de Menilmontant, for 15 years for a machine, which he calls "Trogoctrone," for preserving grain, and destroying weasels. 24th June.

To M. Theodore Paul, engineer, Paris, Rue Notre Dame des Victoires, for 10 years, for improvements on the mode of conveyance, known by the name of the "Systeme Palmer." 24th June.

To M. Jean Baptiste Genoux, formerly printer, at Gap, represented by M. Rusand, printer. Rue Merciere, Lyons, department of the Rhone, a method of stereotyping, which he calls "stereotypie genouxienne," for 10 years. 26th June.

To M. Charles François Guillaume, Paris, Rue du Faubourg Saint Martin, for 10 years, for a hand and horse mill to grind corn. 20th June.

To M. Benjamin Rotch, London, represented in Paris by M. Perpigna, Rue de Grammont, for 10 years, for mechanism, applicable to navigation. 26th June.

To M. Saturnin Gipoulon, goldsmith and jeweller, Fosses de l'Intendance, Bourdeaux, department of the Gironde, for 10 years, for a machine, which he calls "aquacelerifere," for making vessels go in all directions against the current in rivers, and at sea, by manual force only. 26th June.

To M. Jacques François Jullien, paper-maker, at Vascœil, represented at Paris by M. Armonville, secretary of the conservatory of arts and trades, Rue de Saint Martin, for 5 years, for making paper and pasteboard of hay only, or hay with other substances. 26th June.

To Mrs. Dulac, nome Delapierre, Paris, Rue du Faubourg Saint Martin, for 5 years, for a sort of bread, which she calls "substanciel." 29th June.

To M. Jean Antoine Raymond, timber merchant, Paris, Rue Saint Martin, for 15 years, for a metallic tongue with or without mastic, moisture-proof, proper to draw together different bodies. 29th June.

New Patents Sealed, 1829.

To George Henry Manton, of Dover Street, Piccadilly, in the county of Middlesex, gun maker, for his invention of an improvement in the construction of locks for all kinds of fowling pieces and fire arms. 2d. Sept.—2 months.

To John Tucker, of Hammersmith, in the county of Middlesex, brewer, for certain improvements in the construction of cannon. 9th Sept.—6 months.

To Thomas Shaw Brandreth, of Liverpool, barrister at law for a new method or methods of applying animal power to machinery. 9th Sept.—6 months.

To Joseph Ange Fonzi, of Upper Mary-le-bone Street, in the county of Middlesex, Esq. for certain improvements or additions to fire places. 9th Sept.—6 months.

To James Soames, jun. of Wheeler Street, Spital Fields, in the county of Middlesex, soap maker, for a new preparation or manufacture of a certain material produced from a vegetable substance, and the application thereof to the purposes of applying light and other uses. 9th Sept.—6 months.

To Thomas Morgan, of the parish of Tipton, in the county of Stafford, manufacturer of tin plates, for a new method of manufacturing or preparing iron plates or black plates for tinning. 9th Sept.—6 months.

To Robert Torrens, of Croyden, in the county of Surrey, a lieutenant colonel in the royal marines, for certain apparatus for the purpose of communicating power and motion. 9th Sept.—6 months.

To David Lawrence, of Stroud, and John Crundwell of Ashford, gun makers, both in the county of Kent, for certain improvements in apparatus to be applied to fowling pieces and other fire arms, in place of locks, 15th Sept. 6 months.

To George Harris, of Brompton Crescent, in the county of Middlesex, captain in the royal navy, for improvements in the manufacture of ropes and cordage, canvas and other fabrics, or articles from substances hitherto unused for that purpose. 15th Sept.—6 months.

To James Milne, of Edinburgh, architect, for a machine or engine for dressing of stones used in masonry, by the assistance of a steam engine, a wind, a horse, or a water power, whereby a great quantity of manual labour will be saved. 15th Sept.—6 months.

To John Aitchison, of Clyde Buildings, in the city of Glasgow, and county of Lanark, merchant, for certain improvements in the concentrating and evaporating of cane juice, solutions of sugar, and other fluids. 15th Sept. 6 months.

To Thomas Cobb, of Calthorpe House, near Bradbury, in the county of Oxford, Esq. for certain improvements in the manufacture of paper, intended to be applied to the covering of walls or the hanging of rooms, and in the apparatus for effecting the same. 15th Sept.—6 months.

To Thomas Westwood, of Princes Street, Leicester Square, in the county of Middlesex, watch maker, for improvements in watches and time-keepers. 23rd Sept.—6 months.

To Isaac Brown, of Gloucester Street, Clerkenwell, in the county of Middlesex, watch maker, for certain improvements applicable to watches and other horological machines. 23rd Sept.—2 months.

To Hayward Tyler, of Warwick Lane, in the city of London, brass-founder, (being one of the people called quakers,) for certain improvements in the construction of water closets. 23rd Sept.—2 months.

CELESTIAL PHENOMENA, FOR SEPTEMBER, 1829

D.	H.	M.	S.	
1	0	0	0	☉ before the clock 10 *m* 2. Sec.
1	2	0	0	♀ m conj. with 2 αi n Libra
1	14	0	0	☽ in conj. with γ in Libra
1	23	0	0	☽ in conj. with β in Libra
2	15	0	0	♂ in conj. with χ in Virgo
2	17	0	0	☽ in conj. with σ in Oph.
5	0	0	0	☉ before the Clock 11 *m* 33 Sec.
5	11	49	0	☽ in ▭ first quarter.
6	22	0	0	☽ in conj. with β in Capri
8	22	0	0	☽ in conj. with β in Aquarius
10	0	0	0	☉ before the Clock 12' *m* 57
11	14	0	0	♀ in conj. with κ in Libra
12	0	0	0	♅ Stationary
12	3	29	0	Ecliptic opposition, or ● full moon.
12	13	0	0	☾ in conj. with ο in Pisces
13	21	0	0	♀ in conj. with γ in Libra
15	0	0	0	☉ before the Clock 14' *m* 9 Sec.
15	4	0	0	☾ in conj. with 1 ν in Taurus
15	5	0	0	☾ in conj. with 1 δ in Taurus
15	5	0	0	♂ in conj. with η in Virgo.
15	6	0	0	☾ in conj. with δ in Taurus.
15	6	0	0	♀ in conj. with δ in Scorpio
15	11	0	0	☾ in conj. with α in Taurus
17	0	0	0	☿ Stationary
19	2	30	0	☾ in ▭ last quarter.
20	0	0	0	before the Clock 15 *m* 7 Sec.
21	0	0	0	☾ in conj. with ξ in Leo.
21	5	0	0	☾ in conj. with ο in Leo.
23	4	29	0	☉ enters Scorpio
23	13	0	0	☾ in conj. with τ in Leo.
24	1	0	0	☾ in conj. with β in Virgo.
24	17	0	0	☾ in conj. with κ in Virgo
25	0	0	0	☉ before the Clock 15 *m* 49 Sec.
25	5	0	0	☾ in conj. with ♂ long. 9° in Virgo, ☾ lat. 1° N. ♂ lat. 58° N. diff. of lat 2"
25	19	0	0	☾ in conj. with [illegible] in Virgo
27	7	44	0	Eliptic conj. or ● new moon
28	20	0	0	☽ in conj. with τ in Libra
29	5	0	0	in conj. with ϱ in Libra
29	22	0	0	☽ in conj. with φ in Oph.
30	0	0	0	☉ before the Clock 16 *m* 12 Sec.
31	8	0	0	♀ in conj. with δ in Oph.

☽ the waxing moon.—☾ the waning moon

Rotherhithe. J LEWTHWAITE.

THE Select Committee of the House of Commons, on Patents for Inventions, not having published their Report, we are still prevented laying the particulars of their proceedings before our readers, but hope to be enabled to do so in our next number; much important information having been elicited upon this subject, we trust the perusal will be found gratifying.

Patent Office, Chancery Lane.
30th Sept. 1820.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. XX.

[SECOND SERIES.]

Original Communications.

ART. IV.—ON M. A. BERNHARD'S PATENT FOR RAISING WATER.

To the Editors of the London Journal of Arts, &c

GENTLEMEN,—As we have proved that the discharge by this apparatus of the water raised is not the consequence of its *expansion*, it only remains to shew that *condensation* has little to do with the mechanical effects of the machine—at least as a prime mover to an attached train of work. The condensation of a portion of the gases and vapors evolved takes place as observed (page 10,) during their passage through the continually renewed column of water; I reckon little upon the increased condensation by the tube condensers—for the successive portions of the column of water arriving at the condensers are only at 140° Fahr. or less. The rest of the elastic vapors raised, at the same time that they effect the discharge of the water thrown out, are themselves discharged at the exit valve—for the formation and greatest expansive force of those vapors is always in the boiler. Now the principal mechanical force of the elastic vapors raised, has been employed in opening the exit valve against the atmospheric pressure, closing it with a force of 2,000 pounds upon the square foot. It is not therefore by *condensation,* but by the elastic principle as contra-distinguished to condensation, that mechanical power is to be obtained in this machine,—consequently the condensers, so far as they act, operate generally against the power of the machine, although they partially assist the operation of the air pump in effecting at intervals a renewed vacuum. As to the condensation of the water of the column in transit that (by the table, page 7,) can be only one twentieth part, if reduced from the temperature of 142°.5 to 42°.5 the maximum of density.

Mr. Bernhard does not inform us what is the average temperature of the descending column at the exit valve; but I should conceive it to be but little diminished by its passage through the condensers in a tolerable rapid motion; and if the quantum of motion be diminished, the quantity delivered at the discharging valve is proportionately less. Condensation of the water has therefore little connexion with the mechanical results. Although condensation assists the action of the air pump after its operation in first forming the torricellian columns, it appears to me to be a force acting against the forces which effect the throwing out of the body of water, and as contrary forces destroy each other, in this point of view, the condensers may be dispensed with. I may be wrong in several of my conclusions, but the data upon which they are formed are imperfect and the machine itself novel, as far as respects the boiling of a torricellian column of water for the creation of a mechanical power.

The correction of your scientific correspondents will be most acceptable to me, as just conclusions from right principles ought to form the ultimate object of all philosophic research.

The general mechanical powers of this invention as compared with those of the steam engine, which it professes to supersede, can scarcely be considered, for want of data, and comparative estimates of expense in erection, power, fuel, labour, repairs, and numerous other particulars, which can be correctly given only by a series of actual experiments. But a column of water *is* raised by this apparatus and discharged at the height of seventy feet. In this view Mr. Bernhard's machine acts precisely as a force, or other pump, raising the same quantity of water to the same height, in an equal time, and discharging it with an equal velocity. If any such column of water is to be considered a prime mover to a train of machinery by its force or fall from any given height, the question of comparative advantage between Mr. Bernhard's column, and any similar column, discharged in equal time and quantity, with equal force, resolves itself into a calculation of comparative expense for the production of such equal effects. Mr. Bernhard will possibly oblige your readers by stating the quantity of water discharged in a given time, the bore of his pipes, the velocity of the discharge, the quantity of coal consumed and other necessary particulars, which can alone justify any conclusion as to the comparative or actual value of his apparatus, either considered as a mere discharging pump, or as a prime mover.

As a prime mover, the steam engine appears to me me to have a decided advantage; in it the elastic vapors raised are supplied to the cylinder in determinate and even portions; each portion injected effects its object (that of raising the piston and rod) by a regulated movement; it is then condensed or discharged, and the regular pressure of the atmospheric column upon the piston is the even mechanical force which puts the connected machinery in motion. The whole of this operation is regulated to any given number of strokes per minute, which advantage, I apprehend from the nature of Mr. Bernhard's apparatus, cannot be given to *that* under any modification. As a prime mover, the steam engine is therefore preferable in its mechanical construction, and *modus operandi.* As a pump Mr. Bernhard's machine is a *single* instrument of a given calibre, *stationary in situation;* to the steam engine any number of pumps raising a given quantity of water in a given time, and with determined velocity of discharge, may be connected, in several situations, and at various distances, as required; or if one pump to produce a given discharge at a certain height be required, such single pump may be placed in various situations according to circumstances, which cannot be done with Mr. Bernhard's machine.

The comparative capital required, and all attendant expenses of working, are matters to be determined by experience. As to friction, that must exist whether in an exhausting air pump, made air tight, or in the piston of a steam cylinder, made steam tight; the quantum is still a matter of comparison, resolving itself into the question of comparative work performed at a given expense, or of the given work performed at a comparative expense. As to the danger of explosion, I apprehend if safety valves be not fixed to Mr. Bernhard's retorts or boilers, there is danger of explosion from the same causes which produce explosions in steam boilers; the forces which are to produce the effects of the engines originate and produce their strongest and first mechanical action in the boilers in either instance, and as Mr. Bernhard's machine effects the discharge of his column of water notwithstanding the atmospheric pressure, as we have shewn it does by means of elastic vapors, these must act upon the interior surfaces of his boilers, by the principles laid down, at least with a pressure of two thousand pounds upon every square foot.

The purification of the water discharged may be effected to a certain degree, which of course is an advantage in the supplies for domestic purposes. Mr. Bernhard's undertaking is ingenious—its degree of utility must be tested by experience.

If I am wrong in any conclusion, I trust that the notice of the principles of science which I have applied to this interesting subject will at least prove advantageous to the promotion and perfection of future hydraulic and pneumatic machines. The principles of all science are unalterably fixed by nature, and we have to bring our machines to the standard of those principles; we cannot subject these to theoretical innovations for the purpose of reconciling apparent anomalies in the construction and action of our mechanical inventions.

Yours, &c.

ÆOLUS.

ART. V.—MR. ARIS ON THE THEORY OF PARALLEL MOTION.

To the Editors of the London Journal of Arts, &c.

GENTLEMEN,—As I perfectly agree with the observations made in the concluding paragraph of the very useful communication which appeared in your last number, signed PLUMB, that the path of the piston rod of a steam engine approaches the nearest to a straight line when the length of the bridle rods is equal to the radius, or distance of the back links from the centre of the beam. I now beg leave to propose an arrangement of the parts of the parallel motion, whereby they may always be equal, at any radius of the back links; the insertion of which in your valuable Journal will much oblige

Your humble servant,
J. R. Aris.

Sun Fire Office,
Nov. 1829.

I shall give the proportion of the parts of the parallel motion, on the principle of the proposed arrangement, by first putting it in the form of geometrical problem, and shall begin with that arrangement (as a standard) where the radius, or distance of the back links from the centre of the beam, is equal to half the great lever, as represented in the diagram, plate IV. fig 1. (viz.) *a, b, c,* the great lever, or half the beam, *c,* the centre, *b, f,* the back link, suspended midway between *a,* and *c*; in this arrangement when the beam is in a horizontal position, the bridle rod *p, q,* will coincide with the parallel rod *d, f,* but if the back link is to be suspended at any other radius, it will be very easy to determine the places of the fixed centres of the bridle rods by the following method:—

The beam remaining in the horizontal position, produce a line from *c,* through *d,* and the plans of the fixed centres of the bridle rods will be somewhere on that line. Draw another line from *c,* through *f,* and the moveable ends of the bridle rods will be somewhere on that line; their plans may be found as follow:—

Suppose the back links to be suspended from *g,* nearer to the end *a,* of the beam, draw a line from *g,* parallel to *b, f,* and it will intersect the line *c, f,* at *s*; then *g, s,* will be the length of the back link; then place the moveable end of the bridle rod (which is always equal to the radius or distance of the back link from the centre,) to the end *s*, of the back link, in a position parallel to *d, f*, and the other end will fall on the point *r*, in the line *c, d*. This method will hold good under any other situation of the back links.

One case will be sufficient, when the radius of the back link is nearer to the centre than *b*, see fig 2, at *h*, draw a line from *h*, parallel to *b, f*, it will intersect the line *c, f*, in *k*; then *h, k*, will be the length of the back link, and *k, l*, the bridle rod, which is still equal to the radius *h, c*, of the back link. In this case a parallel rod will be necessary to connect the back link with the parallelogram. I have placed it a little higher, that it may be distinctly seen.

Now whether either of the bridle rods, *p, q, r, s, t, v, w, x*, and their corresponding back links, are made use of, the part of the point *d*, will be identically the same, and as a proof of it, a model can be constructed to which may be attached the whole of the bridle rods and their back links, arranged, as in fig. 1, and it will be found that they can all work together.

As the length of the back links is proportional to their distance from the centre, it will be easy to find their lengths by the rule of proportion as follows:—If the radius *b, c*, fig 1, requires *b, f*, the length of its back link, what will the radius *g, c*, require? The result will be *g, s*, the length of its back link, the small addition made to the length of the back links obviates the necessity of the bridle rods being longer than their radius, or distance from the centre.

In this arrangement it will be seen that in the most extreme case, the bridle rod can never exceed the length of the great lever *a, b, c*, nor the back links more than double those of the front.

There are generally but two points in the parallel motion that move in a vertical direction, viz. the point *d*, and the point *m*, fig. 1, where the air pump is usually suspended; but there can be any number of them from one end of the beam to the other, see fig. 3, provided they be all on the lines *c*, *d*, and connected with the parallelogram, as *a*, *b*, *c*, *d*, &c. and beyond the centre at *i*, &c.

Recent Patents.

To JOHN LIHOU, *of Guernsey, but now residing at the Naval Club House, Bond Street, in the county of Middlesex, a Commander of Our Royal Navy, for his having invented an improved method of constructing Ships' Pintles for hanging the Rudder.*—[Sealed 14th April, 1829.]

THE very serious consequences which frequently attend the derangement of a rudder in stormy weather, by rendering the ship unmanageable, has called forth the ingenuity of nautical men on many occasions for years past, in constructing either a temporary rudder, or some means of repairing and replacing the original one.—The new mode of hanging a rudder proposed by Captain Lihou appears however to afford facilities, by which the inconveniences hitherto experienced will be in a great measure, if not effectually overcome, and from the testimony of some of the most able and distinguished officers in His Majesty's Navy, it appears to be a highly valuable improvement.

The Patentee has favoured us with the following observation, by way of prelude to his specification, which we give in his own words:—

" It is an acknowledged fact, that when the rudder is knocked away from a ship, the pintles are generally found to have broken at the neck, or pin; and when such an accident occurs, the vessel becomes completely disabled, though the rudder may not be lost. Under these trying circumstances, the ship is forced to make every exertion to gain a port, for the purpose of re-casting these broken pintles, or obtaining others, thereby losing much valuable time, and incurring great expense and danger in nearing the land in an unmanageable condition. All this inconvenience arises from the present mode of forming the pintles; in consequence of which, when the pin breaks the whole is ruined, and must be re-constructed merely to repair this intrinsically trifling defect; and further, should the broken pin remain jammed in the googing, the vessel must be docked, or hove down (in countries where there are no docks) to get it out. I here allude to what happens to ships of war, Indiamen, and other large sea-going vessels, from the manner in which they are fitted. Small craft frequently use other means, not applicable to the former.

Now, in order to avoid so much disaster, and to give a ship the means within herself, of readily reparing this most serious misfortune at sea, or on foreign coasts destitute of resourses, I have recourse to the following easy method, suggested to me by necessity and dear bought experience in a case of distress on board a ship I commanded in Torres Straits. Namely, I construct the pintles in two separate pieces; the pins or pivots, separate from their straps or braces, into which they firmly fix, and are shifted or removed as occasion requires, somewhat like the crank of the steam engine.

SPECIFICATION.

" The above named improved pintles are constructed of the same metal as is used at present for ships' pintles, or of any metal or combination of metals proper for the purpose. They are of two kinds, which may be distinguished from each other by the appellations of live or hanging pintles, and dumb or bearing or friction pintles: and they differ from those heretofore used by being so formed and constructed as to admit of much greater facility of repairs; because each pintle is composed of separate parts as herein after described. In my improved pintles the pin or pivot of the hanging pintle, and the bearing stud of the bearing or friction pintle, are made separate and detached from the remainder of the pintle, and can be taken out and put in again at pleasure; consequently if the pin or pivot, or bearing stud, should become damaged or broken, it may be taken out and renewed without reconstructing the side brace or strap. The common or ordinary googings are to be used in conjunction with my said improved hanging pintles to keep the rudder to the stern post.

The improved hanging pintles consists of the usual side braces or straps, furnished with bolt holes for fastening or securing it to the rudder, and the head or boss, or mass of metal from whence its pin or pivot projects; but instead of the pin or pivot of the pintle being cast, forged or formed in one piece, with such head boss or mass of metal, a hole must be made through the boss to receive the pin or pivot; which hole may be cylindrical, oval, square, polygonal, or slightly conical or tapered.

Whatever shape it may be formed of, the head or upper part of the pin or pivot must be formed of a corresponding shape, and be made to fit it tightly, and without shake, the intention being that the pin or pivot may be firmly fixed, and rendered incapable of turning round in the boss, or of falling through it. To ensure this the more effectually the head or upper end of the pin or pivot may be formed with a feather, or with fins upon it, let into, or countersunk in the upper part of the boss.

"These pins or pivots, when so introduced from above into their places for use, are to be retained there, and prevented from rising, by the boss of the pintle being countersunk or let into the wood of the rudder, which must fit close and bear upon the pin or pivot and boss. The side braces, or straps, and the bosses of the hanging pintles, as also the googings or braces, should be made stronger than the pins or pivots of such pintles.

"It will be seen from this description, that any or all of these pins or pivots may be removed, and others (which should always be ready prepared and at hand) may be placed in their stead. To effect this it will be unnecessary to do more than to take off the said side braces or straps, or else to remove a sufficient portion of the wood of the rudder that bears upon the heads of the said pins or pivots and bosses.

"My improved bearing or friction pintle consists of similar side braces or straps and boss as the hanging pintle, and may be made of the same materials as I have before pointed out, and is to be affixed in the same manner; but instead of inserting a cylindrical pin or pivot into the hole of the boss as hereinbefore described, I introduce a bearing stud of any hard metal or combination of metals into such hole upwards from below. This bearing stud has a shank and a projecting head or nob on its lower end, which I make hemespherical, parabolical, flat, or in the form of a blunt inverted cone, and the shank that is to pass upwards into the hole of the boss of the pintle, must be so much smaller in diameter than the said protuberance as to leave a considerable shoulder to bear against the under side of the above named boss, the shank that passes upwards through that boss, and the hole that receives it, must respectively be square, or of such a corresponding shape as to prevent the bearing stud from turning therein;

or for that purpose it must have feathers or fins, as before mentioned, respecting the head of pin or pivot of the hanging pintle. The upper end of the said shank must pass through the boss and project a little above it in order that it may be there fixed by a fore lock or cross key, or by riveting, or by a screw nut, or any other sufficient means to retain it in its place, and prevent it dropping out.

" The pins or pivots of the hanging pintles may be also introduced and secured in their respective bosses in the same manner. This friction or bearing pintle may work upon the usual googing, but in order to reduce friction, the friction or bearing pintle must work upon a counter or inverted friction pintle. The pin or stud of such inverted pintle is to be separate and secured in its boss, as before described, and formed either with a flat, convex, concave, indented, or hollowed end, or protuberance of hard metal, for the purpose of receiving and supporting the underside of the corresponding protuberance, head, or stud, of the friction or bearing pintle of the rudder.

" In fixing and applying these bearing or friction pintles, their respective positions upon the rudder and stern post should be such that the whole vertical pressure or weight of the rudder may be thrown upon them. Two of these bearing or friction pintles will, I conceive, be found sufficient for the rudder of a ship of one thousand tons, though more may be used. The number of hanging pintles may be such as may be found necessary to secure the rudder to the stern post. Neither are these improved pintles limited as to the place or position they may be placed in on the stern post and rudder from head to heel inclusive.

" The friction pintles may be placed on the stern post, and the hanging pintles on the rudder, or the hanging pintles may be attached to the stern post, and the friction pintles to the rudder, and as many may of course be used as may according to the size or quality of the vessel be required.

"I mean it to be understood that my only claim under my said invention is for making the pins or pivots of the hanging pintles, and the bearing studs (or heads and the pins to which they are attached) of the bearing or friction pintles, independantly and distinct from the remainder of the pintles.

In Plate IV fig. 4, A, is a rudder and B, the stern post of a vessel fitted with the improved hanging pintles at *c*, *c*, *c*, and bearing the friction pintles at *d*, *d*. Fig. 5, A, is a view of the back of a rudder which fits into B, a grooved stern post in which the same hanging and friction pintles are shewn in corresponding situations. Fig. 6, is an enlarged view of the hanging pintle and its corresponding brace or googing. Fig. 7, is the pin or pivot of that pintle, as it appears when detached from its brace, shewing the fins that prevent its turning or falling through. The wood into which the pintles are fitted, prevents these pins from rising, as shown in figs. 4 and 5. Fig. 8, an enlarged view of the friction or bearing pintle, with its corresponding brace to bear the weight of the rudder. Fig. 9, is the pin or pivot of the friction or bearing pintle in a detached state. Fig. 10, shows part of a chain with a swivel joint for towing a rudder end on in the event of its being knocked off, instead of towing it by the usual rudder pendants, which giving an oblique direction frequently occasion its loss.—[*Inrolled in the Petty Bag Office, October,* 1829.]

To James Marshall, *of Chatham, in the county of Kent, Lieutenant in the Royal Navy, for his invention of improvements in mounting Guns or Cannons for sea or other service.* [Sealed 26th June, 1827.]

"Ever since England became the first maritime power in the world, her elevated position has required the continual application of talent and exertion, and the expenditure of large annual sums, to render the British Navy as efficient as possible; for however varied the policy of different administrations may have appeared on other questions of expediency, and however strenuously economy may hawe been advocated, the maintenance of a powerful navy has at all times been one of the most decided measures of Government, and one of the most popular appropriations of no inconsiderable portion of the national resources.

"Considering the efforts which have been made to perfect the construction and the fitting of ships of war, by the adoption of many valuable improvements in ship-building, and by the introduction of those suggestions in their equipment which mechanical ingenuity or professional experience has been able to supply, it appears singular that no alteration has yet taken place in the mode of mounting ships' guns, though the existing inconveniences of their carriages have never ceased to present themselves to practical men, and to call forth numerous attempts to improve their construction.

"That the art of naval gunnery in point of national importance is deserving attention, equally with that of constructing ships of war, cannot be doubted; since to neglect any means of improving the one, whilst every effort is exercised to advance the other, would be to construct, at vast expense, numerous powerful engines to effect certain purposes, and to be regardless of the means whereby their operations may be rendered useful in the most extensive manner. Indeed so fully have the Lords Commissioners of the Admiralty considered the importance of acquiring celerity and precision in the exercise of ships' guns, that they have most strictly and earnestly commanded that the greatest exertions should be made for the attainment of these objects.

"Hence, the singular fact of a ship's gun carriage remaining the same unwieldy machine, which it has ever been since its first introduction on ship board, in the reign of Henry VIII. is far from being a proof that its construction has not occupied the consideration of His Majesty's Government, or the attention of many naval officers and scientific characters, who have effected improvements in other branches of ordnance equipment; but the inference rather is, that either the established carriages answer in the most effective manner all the purposes required of them, or that, from the principle upon which guns are mounted, they are incapable of improvement.

"How far the present gun carriage is calculated for sea service will appear by adverting to some of the duties it is required to perform; when, to the unprejudiced at least, it will be evident that there scarcely exists a machine or instrument, by which important objects are to be effected, more devoid of mechanical contrivance or less calculated to facilitate the efforts required in its application.

"In the first place, a ship's gun requires to be moved quickly in different directions, and is subject to be checked very suddenly in its motions: it is nevertheless placed upon a carriage, whose axletrees are immoveably bolted parallel to each other, and upon which its weight is so disposed that nearly the whole of it rests upon one extremity of the carriage. When a gun is so improperly placed upon a carriage so imperfectly constructed, the inconveniences in working it, as regards the violence with which it tilts up, and the difficulty which exists in laterally moving the fore part of the carriage, are consequences which naturally follow.

"When a gun is much heated by continued firing, the recoil becomes more and more irregular; and it consequently requires to be replaced more frequently in its proper position in the port. This should be effected by as little labour as possible; for the prolonged continuance of the action, which occasions a more frequent occurrence of the operation, produces a reduction in the means whereby it is to be accomplished; the strength and numbers of the crew decreasing as the engagement advances. Yet to square a gun, or laterally move it, in its port upon the old carriage, is attended with more difficulty and labour than any other part of the exercise.

"It is evident, that the further guns can be pointed towards the bow or quarter, the more powerfully will they defend the ship and assail the enemy. It will consequently be supposed that the size of a port will form the limit to the angle at which a gun can be trained or pointed across it; but this is not the case: for the form of the old carriage generally prevents the guns traversing through an arc so great as might otherwise be obtained, by from eighteen to twenty-four degrees: and thus, as it were, the application of the instrument is limited by the clumsiness of its handle.

"It may be desirable to state briefly a few reasons why it seems impracticable to remove the objections which are attached to the old carriages, so long as the ancient practice of mounting ships' guns by their trunnions is continued.

"First, since the width of the fore axle prevents a gun's turning to the greatest angle across its port, this must be contracted to remove the objection; as, however, nearly the whole weight of the gun rests upon the *fore* axle, its stability, as regards any tendency to upset, would be decreased by thus narrowing its bearings; nor would any extension that could be given to the width of the hind axle always restore that safety to the gun which a contraction of the fore trucks would endanger; because the violent twisting check, which the irregular action of the breeching sometimes occasions, at the same instant tilts up the gun and throws its whole bearing upon the fore axle, which has alone to resist any tendency the gun may then have to upset.

"With the truth of these observations will appear the necessity of resorting to new principles in the construction of gun carriages, in order to obtain those material improvements in naval gunnery which it is the object of the patentee to effect.

"The new gun carriage consists of two distinct parts, whose movements are independent of each other; and which, though jointly supporting the gun, have separate duties to perform: one is termed the BREECH carriage, the other the BREAST carriage.

The breast carriage, Plate V. fig. 1, *a*, consists of a block of elm, in which two plates of nearly similar form are let in flush upon the top and bottom surfaces, and secured in their places by the clinched bolts. The upper plate is made much thicker than the lower one, and one bolt stouter than the others. By means of these plates, termed eye plates, the breast carriage is attached to the centre of the port by the breast bolt *g*, passing through the holes *e, e,* and through the gudgeons *c, d,* which are fixed to the ship's side.

In the eye plates, the holes *x, x,* form a socket in which the spindle of the crutch works; a hole having been made through the breast block sufficiently large to prevent the spindle of the crutch from ever becoming tight in it. To the under part of the breast block, is bolted an iron axle *w,* upon which a bushed wooden truck works, and the end of the breast carriage traverses. The upper gudgeon *c,* is fixed to the ship's side, by bolts passing through the timbers, and the top eye plate rests upon it. The lower gudgeon, or a socket placed upon the waterway, as most convenient, is only required to steady the heel of the breast bolt, and does not support any of the weight of the gun.

The crutch *h,* shown also in fig. 2, is formed of wrought iron, and receives within the lower part of it a small block of wood, upon which the gun rests and works. The block is made a little concave to receive the gun; and, in the other direction of its upper surface, is so cut away, or made convex, as not to interfere with the gun's lodging on nearly the centre of the block, when it is elevated or depressed.

The breech carriage, fig. 1, *b,* is formed similarly to the old gun carriage, with the fore part of it cut away; *p, p,* are iron clamps with a hinge at *o;* the lower part is secured to the front of the breech carriage by a bolt, and by the eye pin, which is clinched at *v.* The upper, or moveable part, spans round the trunnion; and, being fore-locked down to the eye pin, suspends or attaches the front of the breech carriage to the gun. The breech of the gun is supported upon a bed and coin, and is elevated and depressed by them in the usual way.

The circumstance which renders practicable this mode of mounting long guns, in ships of war, is, that contrary to land service, the gun is stopped in its recoil by a strong rope or breeching as soon as the muzzle arrives sufficiently within the port to allow of its being conveniently loaded; for since it happens that the proper and usual space over which a gun is allowed to run in, (all unnecessary recoil increasing the delay and labour of running the gun out) is, on an average of cases, about equal to the distance of the gun's trunnion rim from its muzzle rim, it follows that all the action which a gun should have, in and out of its port, is obtained by its being made to slide backwards and forwards from its trunnion to its muzzle upon the stationary rest or crutch of the breast carriage. The gun is prevented from running out any further by the trunnions, or trunnion rim, coming in contact with the crutch; and when the gun is run in, the approach of the muzzle any nearer to the crutch, or the danger of its recoiling too far through it, is not only prevented by a stout breeching, but doubly guarded against by a strong breast rope, fixed to the breech carriage, and passed round the crutch.

Thus are the two parts of the carriage prevented from approaching into contact, or of receding too far from each other, whilst the gun itself preserves the communication between the two parts of its carriage.

The chief novelty of this principle of mounting, consists in having removed the bearing of the gun upon its carriage, from the trunnions (which have now nothing to do with supporting the gun) to a fixed point at the breech, and a moveable point somewhere between the muzzle and the trunnion.

The axis of motion, upon which the gun is now elevated and depressed, is therefore no longer at the trunnions, but at the point where the fore part of the gun rests upon the crutch block; and in each change which this axis undergoes, a support will be afforded to the gun exactly in the place where it is wanted; for when it is run out, (the only situation in which the elevation is adjusted), the axis of motion is nearly in the centre of the gun, to facilitate the operation; and when the gun is run in, and stopped by the breeching, (the only case in which it has any tendency to tilt up), the axis becomes a prop at the muzzle to prevent it.

With regard to the motion of the gun upon its crutch block, it may be remarked, that the quantity of friction produced depends in a great measure upon the hardness and extent of surface of the block. Upon a metal block, a gun may be found to work too lively: on a broad elm block, not sufficiently so. Lignum vitæ appears the most suitable for heavy guns, and elm for light ones.

The breast carriage not only supports the fore part of the gun, but affords the means of traversing it from one side of its port to the other. Thus, in fig. 3, the weight of the gun, resting on the crutch at the point *x*, may be drawn over to the position shewn by dots, with the greatest facility, by the small breast tackles *d, d*; when, by traversing the breech round at the same time, the gun is at once placed in any position across its port. The gun being at liberty to move round upon the crutch pin at *x*, as an axis of traversing motion, it is not necessary, in training round, to move both the breech and the breast carriage at the same moment; nor are both these parts of the carriage required to be in the same line when the gun is fired. By moving either the breast or the breech of the gun, the aim may therefore be altered, and the breech carriage may recoil in any direction, without producing any twisting strain upon the crutch or breast carriage.

In the construction of the new carriage, attention has been paid to economy. The guns in use require no alteration, and the present carriages may be converted into breech carriages by removing the fore axle. The gunners' stores in use are also applicable to the new system.

With regard to the weight of the respective carriages, an old one of seven cwt. is replaced by a breech carriage of five cwt. and a breast carriage of three cwt.; thus the total weight of the new exceeds that of the old, in a twenty-four pounder, about one cwt. The moveable part of the carriage, however, or that which the crew has to put in motion in running out the gun, is less by two cwt. than the old carriage.—*Inrolled in the Inrolment Office in Chancery, Dec.* 1827.]

To William John Hobson Hood, *of Arundel Street, Strand, in the County of Middlesex, Lieutenant in the Royal Navy, for his invention of certain improvements on pumps or machines for raising or forcing water, chiefly applicable to ships.*—Sealed May, 1827.

The subject of this patent purports to be an improved and novel construction of ships' pumps, but after a very attentive perusal of the specification, we are unable to point out what are the particular novel features claimed.

The Patentee proposed to employ an apparatus on ship board, on the principle of the force pump, instead of the lift pump, on the latter of which constructions ships' pumps in general are made. The access to the bottom of the rising main is to be through a tube placed across the kelson, and open at both ends to the hold, so that the water may readily flow in on either side; and a grating is to be placed within, for the purpose of preventing the ingress of pieces of wood, or any other substances. At top of the rising main a close square vessel is placed, called the condensing vessel, which is to act as a reservoir, from whence the water is to be forced by the action of the plungers in the pump barrels. This reservoir is divided into distinct compartments, with valves.

The pistons are worked by means of jointed rods, which in ascending bend round the periphery of a reciprocating skeleton drum wheel, but in descending become straight like stiff rods. The top of each link or joint of the rods has a crutch, which crutches are intended to bear against the rails of the skeleton drum; and thus by the rotation of the drum the rods are forced down, and the pistons worked, for the purpose of forcing the water out of the close reservoir.

The reciprocating action of the drum wheel is effected by sweep rods connected to cranks upon rotatory shafts, worked by men on the decks above; and one advantage proposed by this arrangement is that the pumps are stationed so low in the vessel, as to be out of the reach of gun shot.

The reservoir, or condensing vessel as it is called, being made very strong, if its discharging valves are properly closed, and a flexible pipe or hose attached to its top, the working of the pumps will cause the water to be forced out in a jet, like a fire engine, to which purpose the Patentee purposes occasionally to apply it.—[*Inrolled in the Inrolment Office in Chancery, Nov.* 1827.]

To Joseph Anthony Berrollas, *of Nelson Street, City Road, in the parish of St. Luke, in the county of Middlesex, Watch Manufacturer, for his having invented or found out a method of winding a watch or clock without a key; which he calls Berrollas's Keyless Watch or Clock; and also a certain improvement to be applied to his late invented detached alarm watch.*—Sealed 13th Dec. 1827.

The trouble occasioned by the ordinary mode of applying a detached key to the back or face of a watch for the purpose of winding it up, has induced the Patentee to construct an apparatus of a very simple nature, which effects that object by drawing out a button at the pendant.

The Patentee says, "My invention consists in a new mechanical arrangement, applicable to the winding up of horological work; first, as respects what is termed a going barrel the following are the contrivances which I have invented as applicable thereto:—Plate V. fig. 6, represents a watch with a going barrel, to which my invention is applied. In this figure a part of the watch face is removed, in order to exhibit the novel parts within, the operations of which will be best understood by describing the separate detached figures.

Fig. 7, is the barrel ratchet, with its click and spring, which keep the maintaining power up. This ratchet is put on the barrel arbor, which is squared, and the plate is sunk, in which it lies; it is on the side of that part of the plate that is under the dial. This barrel ratchet is sunk or turned out as far as the teeth, to receive another ratchet with its click and spring, which I call the recoiling ratchet. This recoiling ratchet is fastened on to the barrel pulley, the upper side of this barrel pulley being sunk to receive a spring, as seen in fig. 6, which is the recoiling spring.

"On the edge of the barrel pulley *a*, there is a groove to receive a chain *b*, shewn detached at fig. 8, which is hooked to a pin in the said groove. This fig. 8, gives a perspective view of the stud which keeps the barrel pulley steady and close to the barrel ratchet. The centre of this stud is round, and the centre of the recoiling spring is hooked on; the other end of the recoiling spring is hooked to the barrel pulley.

"Figs. 6 and 8, shew the impendant *c*, made of the same metal as the case; it turns freely on a piece of steel *d*, fig. 8. This steel arbor has a small knob on one end *e*, to prevent the impendant from slipping off; on the other end it is split to receive the end of the chain *b*, which is pinned on. The pendant of the case is perforated, through which the chain passes.

"I shall next describe the manner in which this apparatus is intended to operate, and how it is to be put on the winding up arbor.

"When the barrel ratchet before mentioned is put on the square arbor, the recoiling spring is put on the barrel pulley, and placed over the barrel ratchet, so as to act in its click; the chain, which is not longer than to produce one revolution of the pulley, is put through the pendant, and hooked on to the pulley; the stud is then hooked to the recoiling spring. By this stud the recoiling spring is set up one turn, more or less, and the stud is screwed on the plate.

"To wind up the watch, the impendant is drawn by the finger and thumb from the pendant, as far as the chain will permit it, and on being released, the recoiling spring will bring the impendant back again to the pendant; and this operation being repeated till the pendant cannot be drawn out again, indicates that the main spring is wound up.

"When the works are to be wound up by a fusee arbor, the ratchet which keeps up the maintaining power is on the fusee itself; the fusee arbor square is on the same side of the plate as the going barrel, under the dial. The recoiling ratchet is then put on the fusee arbor, its click and spring being on the barrel pulley.

"Here it is to be observed, that when any works are to be wound up by a fusee, the fusee with the first wheel and its arbor return back again: which is not the case with the going barrel; *i.* is the relieving click which has a double action; first it acts as the recoiling click by its action in the ratchet, and secondly, it acts as a reliever of the said click. It is placed on the under side of the barrel pulley with its spring. That part which is near the edge of the barrel pulley has a small pin, which pin goes through an aperture of the barrel pulley into the groove where the chain lies.

"When the works are wound up, the impendant rests upon the pendant, and the chain lays round the pulley, which is the same as with the going barrel. The pin of the relieving click which goes into the groove of the barrel pulley receives a pressure from the chain, and brings the click part out of the ratchet, and gives free action to the ratchet on the fusee arbor to return back again without any drag or incumbrance of the click."

A contrivance is proposed for setting the hands without a key, which consists of a rose head or milled edged boss, placed on the central arbor of the watch, and to which the minute hand is made fast. It is shewn in fig. 6. at *l*, is described by the Patentee as "the finger touch; it is made of gold or some metal which will not rust. When the hands are to be set, a slight pressure with the end of the finger is required to turn the hands.

"The foregoing is a full description of the general principles of my invention, applicable to pocket watches; the only alteration it will require for clocks is in the chain and the impendant, which must depend on the form of the clock case."

A slight alteration is proposed in a part of the mechanism of the alarm watch, for which a Patent was granted to the same party in April, 1827 (see Vol. II. of our present Series, page 84). It is now proposed to place the discharging part, or we may call it the trigger of the alarm in a different position, in connection with what is called the elevator; but this suggestion, as an improvement, being of a trifling nature, and not capable of being understood without a full explanation of the alarm, we consider it unnecessary to enter further into its detail.

The Patentee concludes by saying, "The points upon which I ground my right of exclusive privilege to the above invention, under my aforesaid hereinbefore in part recited Patent, are, the new combination of mechanism which I have produced in the simple, easy, and convenient way of winding up or setting the hands of horological works or movements, by the combined operation of the recoiling ratchet, its click spring, the recoiling spring, the barrel pulley, the relieving click, the stud, the impendant with its chain, and the finger touch. But I hereby distinctly disclaim any exclusive right, benefit, or advantage to the individual parts hereinbefore described, which I claim only in their combined and collective capacity, my present patent being for a new mechanical arrangement and combination of parts already well known, but now applied by me to the production of a new purpose and effect."—[*Inrolled in the Inrolment Office in Chancery, February,* 1828.]

To **Joseph Apsey,** *of John Street, Waterloo Road, in the Parish of St. Mary, Lambeth, Engineer, for his invention of an improvement in machinery to be used as a substitute for a Crank.*—[Sealed 27th November, 1827.]

This contrivance is intended as a mode of converting a reciprocating motion into a rotatory motion, as the vibratory action of the beam of a steam engine, which is usually conveyed to the shaft through the agency of a crank, and thereby is caused to exert a rotatory power.

In the present instance, we have a repetition of the old plan of two wheels between a double rack, as in the Patent of Mr. Aldersey, described in the Second Volume of our First Series, page 267, but with trifling difference. In the former instance, a pall connected to each wheel was made to take into a ratchet fixed on the rotatory shaft, whereas in the present, clutches are employed.

Plate V. Fig. 9, represents the eliptical frame *a, a,* to which the racks *b, c,* are affixed; *d, d,* is the axle of the wheels *e, f,* which are shewn detached at fig. 10. These wheels and their bosses slide loosely round the axle *d,* and are severally locked to the axle, when the notch or clutch of the boss takes hold of the corresponding notch of the end piece *g,* or *h.* These end pieces are confined to the axle by small projections fixed on the axle, called feathers or leaves, which fall into notches in the hollow part of the end pieces; but these pieces are allowed to slide side ways, and are pressed up towards the wheels by spiral springs confined by the ends of the cylindrical case.

If it be supposed that the eliptical frame *a, a,* be attached by a perpendicular rod to the end of the vibrating beam of a steam engine, and by that means be made to move up and down; the rack *b,* as it descends, taking into the teeth of the wheel *e,* will cause it to turn round, and the notch of its boss locking into the clutch or end piece, will drive the axle *d,* round with it, in the same direction; but as the eliptical frame *a,* ascends the notch of the boss of the wheel *e,* will unlock itself, and the wheel will retrograde without effecting the axle. The other rack *c,* being opposite to the wheel *f,* which drives round its boss, now locking with the other end piece, causes the axle *d,* to continue revolving in the same direction as before.

Thus it will be perceived that the racks of the reciprocating frame *d,* acting in the teeth of the wheels *e,* and *f* will cause those wheels to perform a reciprocating motion on their axis, and by their occasional locking to the clutch pieces will communicate to the axle a continuous rotatory movement.—[*Inrolled in the Inrolment Officce in Chancery Jan.*, 1828.]

To Daniel Ledsom and William Jones, *of Birmingham, in the county of Warwick, Manufacturers, for their invention of certain improvements in machinery for cutting Sprigs, Brads and Nails.*—[Sealed 4th December, 1827.]

The machinery which constitutes the subject of this Patent is designed to cut off wedge shaped pieces from narrow strips of sheet iron, but as it has no provisions for forming the heads of nails, it must be considered as confining itself to the production of brads and sprigs only.

Plate V, fig. 4, is a side view of the machine; fig. 5, is an end view of the same. The sprigs or brads are produced by tapering or wedge shaped pieces cut in succession from the ends of a strip of iron, shown by dots at *a, a*; the cutters are *b, b*, and *c, c*, between which the strips of iron are placed. The cutters *b*, are made to slide horizontally; the cutters *c*, are fixed in the end pieces of the frames or bearings *d, d*; and the reciprocating action of the sliding cutters brought against the edge of the fixed cutters, cause the pieces successively to be severed off from the strips of iron by the strokes of the sliders.

Rotatory motion is given to the main shaft *e*, by a band from a steam engine, applied to the fast rigger *f*, or the machine is stopped by slipping the band on to the loose rigger *g*. On the main shaft there is a crank *h*, from whence a rod *i*, is carried to the jointed arms *k, k*. These arms are attached by joints to the sliding blocks of the cutters *b*, and as the crank goes round the arms are raised into a straight line, and the cutters by that means put in operation.

The feeding, that is, the mode of conducting the strips of iron into the machine, is as follows:—

To a beam near the ceiling of the workshop a horizontal rod is attached, from which any required number of rods are suspended by hooks at their upper ends. Upon each of these rods a carrier is placed, which slides down the rod by its own weight. The carrier has a recess or socket at its under part, into which the upper end of the strip of iron is inserted, and the lower end of the strip is brought between the two cutters *b*, and *c*, bearing upon an inclined plane *m*, *m*, which acts as a stop, and limits the breadth of the brad or sprig to be cut.

It is necessary to cut the ends of the strips in a slanting direction, in order to give the piece cut off a wedge form, the cutters, with their frames or carriage, are made to oscilate. The mode of effecting this pendulous motion will be seen by the end view of the machine. On the main shaft there are two excentric wheels *l*, *l*, which work in frames, *n*, *n*, affixed to the under side of the carriages of the cutters; as the main shaft revolves, the frames *n*, *n*, vibrate, and cause the frame *d*, *d*, with the cutters, to incline a little from the true horizontal position; consequently if the strips of iron descend perpendicularly, their ends will be cut off in a bevel which forms one side of the inclined plane of the wedge shaped sprig or brad: the next stroke of the cutters taking an inclination in the opposite direction, causes the other edge to be bevelled in the reverse way; which completes the wedge form of the brad or sprig. In this manner, by a succession of operations, the brads or sprigs are cut, the point of one being next to the head of that which follows in succession, and so on.

The length of the brads or sprigs thus made will depend upon the breadth of the strips of iron from which they are cut, and any number of strips may be suspended in the manner described. The weight of the carries sliding down the rods, bringing the strips down, so that their ends shall always bear upon the stop, and any number of these strips may be suspended alongside of each other, so as to cut a great many brads at one time.—[*Inrolled in the Inrolment Office in Chancery, June,* 1828.]

REPORT

Of the Select Committee appointed to inquire into the present state of the law and practice relative to the granting of Patents for Inventions; and to report their observations thereupon to the House; together with the Minutes of the Evidence taken before them:—have agreed to the following Report:—

The subject referred to the consideration of Your Committee, is in its nature so intricate and important, that it has occasioned the necessity of examining Witnesses at great length; at the present late period of the Session, they are only prepared to report the Minutes of the Evidence taken before them, together with several documents: and they earnestly recommend to the House that the Inquiry may be resumed early in the next Session.

MINUTES OF EVIDENCE.

The following selection is made not exactly according to the order in which it is published, but for the sake of shewing the contrariety of opinions given by the several parties:—

Davies Gilbert, Esq. a Member of the Committee, examined.

What is your opinion of the policy of the present law, in granting patents upon abstract principles?—The object of the present law of patents is to excite ingenuity; there must be encouragement held out to persons by the community, to exert their talents for the benefit of the public.

What is your opinion in respect to principles being the object of patents?—I conceive that the invention of a principle is a much greater atchievement, and much more likely to produce great public benefits than the invention of any mode of applying a principle already known; I therefore think that *à fortiori*, there should be protection given, and encouragement held out to the discoverers of new principles, and that they should be secured to their inventors for the legal number of years, but always assuming that some practical mode of applying them to useful purposes make a part of his invention, and is included in the specification, and then I think that the inventor should not lose the benefit of his temporary monopoly in consequence of another or even a better mode of application being discovered.

What is your opinion of the expediency of appointing a commission, composed of scientific men and lawyers, to examine a specification before it is enrolled, to ensure the patentee from having his patent afterwards impugned?—I think it would be highly expedient that some person or persons more competent to judge of scientific matters and inventions than the Attorney General, from the course of his ordinary parsuits, are in general to be found, should be called to his assistance; but I would not preclude either party from any subsequent legal remedhe may choose to adopt.

Do you not consider it might be beneficial that a commission should be appointed to examine a specification before it is enrolled, in order to see whether the discovery is sufficiently described or not?—I have stated that it would be highly expedient to assist the Attorney General in such cases, and especially when any points are disputed; but I would not have the determination in such cases preclude persons from proceeding to a court of law.

You would not have a commission then to inquire whether the specification really agreed with the invention or not?—So far as it went to guide the opinion of the Attorney General as to granting patents at all, and to whom they should be granted, I think a commission would be highly useful; but I entirely dissent from any opinion which would give authority to such decisions, so as to preclude persons from recovering afterwards in a court of law.

Do you not think it desirable that a commission in some cases should be appointed?—Yes.

Would it not be desirable that the evidence taken before the commissioners should be perpetuated so as to be produced in a court of law, in any case where the patent should be impugned in order to enable the patentee to defend his invention?—I should not have the least objection, if it were practicable.

What is your opinion of the policy of the law which vitiates a patent, if one feature of the invention, described in the specification, is proved to have been known before the sealing of the patent?—I think that the rule of law which vitiates the whole of a patent in consequence of a partial defect, is inexpedient, unless fraud can be proved.

If it should be found convenient to make an alteration in the present law, do you think that a tribunal of scientific men would better decide the validity of a patent, than if it was tried in a court of justice?—It must frequently happen in a court of law, that neither the counsel nor the jury are qualified, by their previous knowledge, to decide on such cases, and consequently, men of general science, acquainted with the subjects in dispute, must be more competent to forming accurate judgments in respect to them; but I am not aware how a tribunal of such persons could be formed, unless it was done through the medium of a reference. The definition of a man of science, would seem to be a matter of no small difficulty.

Do you think it would be convenient to have a commission of scientific men, and not a jury?—With respect to a commission of scientific men, I certainly think they would be more competent to decide, but public opinion would probably not be so confident of their exemption from bias from *esprit de corps*, perhaps from influence, as in the case of our ordinary tribunals.

What is your opinion of the policy of allowing a person to take out a patent for an invention communicated to him by a foreigner, and excluding him from taking out a patent for an invention communicated by a British subject?—I am of opinion that it should be lawful for a person to take out a patent for an invention communicated to him by a British subject, provided, of course, that it appeared the communication was voluntary.

Will you state your opinion as to the propriety of allowing persons to take out a patent for a shorter period, paying a proportionate smaller fee?—I should think the fees of patents cannot be made proportionate to the importance of the invention, and consequently it may be advantageous to allow individuals judging for themselves, to secure a monopoly of less than fourteen years, on paying diminished fees.

Might it not be advisable to make different regulations for the different sorts of inventions, separating, for instance, the mechanical from the chemical discoveries?—I think it would.

Mr. Mark Isambard Brunel, called in; and examined.

You are an engineer?—I am.

Will you have the goodness to state any views you may have with respect to patents, or the patent laws?—I know very little of the patent laws; I have had several patents myself. I think that patents are like lottery offices, where people run with great expectations, and enter any thing almost; and if they were very cheap, there would be still more obstacles in the way of good ones. I think the expense of patents should be pretty high in this country, or else if it is low you will have hundreds of patents more yearly, and you would obstruct very much the valuable pursuits.

Do you conceive that 500*l.* is not too much?—That is too dear; I think that the expense of three patents is too dear; there are very few that take them from that circumstance; they imagine that it is enough to have a patent for England, and they think it is of very little use to have a patent for Ireland.

Could you suggest any means by which this too great facility of granting patents might be remedied otherwise than by the expense?—It is very difficult; it would be a very desirable thing to give more time to improve the invention, and then to come with a complete specification.

Do any means occur to you of protecting the applicant for a patent during the interval after he has applied for a patent and before the patent is sealed?—What is called a caveat is one of the means of doing that, and it has some effect, because then notice is given if another person comes to solicit a patent, if it can be detected in the head of that patent, that it has a similar object with that for which another person has taken a patent who has already entered a caveat. The caveat might be a little more extensive than it is, because if you change the name of the thing, it escapes the observation of the officers, and the two patents both go on; but if they are alike, there is a stop directly of the second. They are called before the Attorney General, who hears both sides, and he says to the second, you are like the other, and therefore first come first served.

Have you considered whether it would be advantageous to have a commission of persons appointed to examine the specifications?—I think it would be a very good thing; I should imagine that it would be an object for that commission to receive a rough outline of the invention, and to give the inventor a year or two to improve his machine, and then he may come again to the commission, and deliver a specification with all the improvements he has made during that time; that, I think, would be desirable.

Do you agree with the last witness in recommending that the patents should not be issued before the specification is ready, but that the certification should be contained in the patent when it is issued?—I see no inconvenience in that.

Are there any particular points with respect to patent or patent laws upon which you could give the Committee any information?—Nothing occurs to me.

What do you think of the present rule of law, that the patents cannot be given for an abstract principle ?—I think that is wise, and ought to remain as it is; it would be dangerous to grant a patent merely upon a principle.

Supposing a person to have discovered a valuable principle, should he not be entitled to some remuneration from those that carry it into effect ?—Of course.

Supposing any person should discover a means of making that principle useful to the public, would it not be right that the person who discovered the principle should have some compensation ?—Certainly.

But you think that the person is not entitled to any patent right for the discovery of a principle, unless he has discovered some mode of carrying it into effect ?—No, as a principle it is of no use whatever ; it may remain ages, as steam has remained ages, unused.

Are you aware of any valuable inventions for which patents have been granted, that have been lost upon some technical point ?—I cannot specify any one in particular, but it is generally known that there are such cases, and a great hardship it is, when, for a trifling flaw, a patent is set aside ; I have had to support my own right in one instance ; I took out a patent for an improvement, and I specified the thing altogether ; I could not maintain my action, because I was told I ought to have specified and defined what preceded, and what was my improvement ; now, every body could know what existed before, and they might have used it, but it was very hard for me to lose the patent because that was not exactly specified according to the law.

Have you considered any remedy for that inconvenience ?—There would be no inconvenience whatever in allowing the patent to stand good, because any one might take the preceding part, without infringing the patent.

You are aware that if a person specifies any thing old in patents he loses his patent ; do you se any objection to that ?—

There is a great hardship in that, if it is a thing which does in fact set his patent aside, then of course it ought to fall; but if it is a trifling thing, he ought to have the benefit of the remainder. It is a thing which nobody can guard against, because no inventor can know the thousands of patents that have preceded.

When a patent has been infringed, what remedy has the patentee?—An injunction against the supposed infringer; but if he closes his doors, you have great difficulty to get a knowledge of what he has done: the person says, My invention is not like yours, and I will not show it, because there are important things in it.

Upon the whole, do you think the patent laws are beneficial to the public?—Very much so.

What is your opinion as to the period of fourteen years?—It is a great deal for some, and not enough for some others; I shall lose probably six years before I come to make any thing of my present patent.

Are you aware of the practice in France, with respect to the period of time that is granted?—Yes; that is better.

Can you suggest any better plan than that?—Perhaps there might be better plans for this country.

Do you think it would be desirable to allow a longer time for muturing the invention, before putting in the specification?—I think it would; if a longer time was allowed for an invention to be matured, the fee might be increased without any bad consequence,

Would you increase the time beyond fourteen years?—I think that might be done, in some cases.

In whom would you leave the discretion of giving a longer period?—That is a difficulty which I am not capable of removing.

Should the longer period be given by way of extension of the old period, or as an original period?—I think it ought to be an extension of the patent.

Would you think it desirable that a man might take out a patent for a shorter period than fourteen years?—Yes.

In that case do you think he ought to pay a smaller fee?—Yes.

The establishment of a commission has been mentioned as one of the propositions for the regulation of patents; do not you conceive that there would be much objection to a commission of that description, arising from the jealousies that would subsist?—Very great; if the invention could be laid before them, without knowing from whom it comes, it would be very desirable.

Do you think that in most cases parties could be brought to agree in the appointment of referees?—It would then be partial; because each party would of course name as many of his friends as he could.

Do not you conceive that the Secretary of State might appoint *pro re nata* commissions of proper persons that would be satisfactory, upon the whole, to the public?—I have not thought enough of that; it is a serious question to answer.

What is your opinion as to the present mode of trying the validity of a patent by a jury?—I have frequently said, that I might as well toss for the fate of a patent; it is an intricate question for a jury, and in many cases it is quite unintelligible to them.

In such cases would not the appointment of a tribunal composed of scientific men, be very desirable?—Certainly it would be a very good thing; for example, one might say that the Royal Society would be a proper tribunal.

Do you conceive that the chance of having a patent fairly tried is greater with a special jury than with a common jury?—I think it is better; but if it is to be decided by a jury, it would be much better that it should be by some persons in the profession; at any rate it should be by competent persons.

Is not the number of such competent persons so limited, that the choosing them would almost amount to appointing a commission?—Certainly, that might be so.

Do you conceive that many persons are deterred from taking out patents by the insecurity of the present law?—I think it is a great discouragement.

Do you think that more people will depend upon secresy than upon patents?—Probably so.

And in that case many good inventions are probably lost to the public?—Yes.

What are the prices of patents in France?—I think it is 1,500 francs for fourteen years.

Do you consider that too low a price?—For France it is very well, but for this country it would be too low.

What would be your opinion of giving a power to the Secretary of State or some other authority, to direct the specification to be concealed in certain cases?—I do not know what is the motive for concealing it; if it is on behalf of the inventor, that is some reason, but if it is to prevent its going abroad it is of no use, because if it is good it will soon make its way, and if it is not it is of no consequence.

Is not that the mode adopted in France?—It is; but it is not that liberal principle which exists in this country.

Is any inconvenience found to result from it in France?—I am not aware.

May it not operate with great injustice upon individuals who, not knowing of the patent on account of its secrecy, may be expending sums of money in accomplishing the same thing?—That is a great inconvenience.

Could you communicate it sufficiently to the public to enable them to avoid pirating the invention, without at the same time enabling them to make it?—Certainly not; because if a man gets two or three things, he will find out the remainder.

What do you think of the policy of allowing a patent to be taken out for an invention communicated by a foreigner, and excluding a person from taking out a patent for an invention communicated to him by a British subject?—I think it would be better if it were the same in both cases.

Is there any inconvenience in the present law which limits the number of persons interested in a patent to the number of five?—That is a commercial question, to which I cannot give any opinion; I think it would be mischievous to extend it without a limitation.

Mr. Charles Few, called in; and examined.

ARE you conversant with the practice of taking out letters patent?—I have taken out several.

Do you agree in the opinion which was given by the last witness, as to the expediency of the Attorney General appointing assessors or commissioners to examine the matter of the petition, before he recommends it to be passed?—I entirely concur with him on the efficacy and the propriety of a commission, instead of the present mode; because the practice before the Attorney General is little better than a farce at present; I would allow every person that chuses to take the risk and expense, apply for a patent and have that patent, in case no caveat is entered against him. In case of a caveat, I would have it come before the Attorney General or a barrister to be appointed, who should be the head of a commission, which might easily be formed of scientific and practical men. When Mr. Howard was obtaining his patent, we attended before the Attorney General and Mr. Constant, who was soliciting a high pressure patent, I believe, we were heard before Sir Vicary Gibbs, and he stated that he was so satisfied that Mr. Howard's patent was the same in effect as Mr. Constant's, that he would not allow them to run on together, and therefore suspended ours; we had to wait till his specification was in (I believe six months), and when we saw his specification, it was as little like as need be, and we obtained our patent.

Mr. Aikin also stated, that he thought it would be desirable that a commission should be appointed to examine the specification, in order to ascertain whether it is a sufficient specification; do you concur with him in that?—Upon that point, I differ with him entirely; I think it ought to be at the risk of the party putting in his own specification; but I would leave the sufficiency of that specification to be decided not by the courts of law, but by a commission. If a patent was granted, and any person wished to set aside that patent, he should do it by a petition to the Great Seal; and that petition should be referred to a commission, who should decide it.

You would not have the validity of a patent tried by a jury?—Certainly not; for very frequently they can know nothing about what they so try.

Then you would confine the operations of the commission to cases in which the patent is in dispute?—Certainly; there are many objections occur to me at the moment to Mr. Aikin's plan; the commission ought to have the patented article brought before them perfect, not be themselves bound to be present at the operations; suppose it is an improvement in a diving bell, or an improvement in a ship's cable, or an improvement in some colliery, are the commissioners to go into the diving bell, or are they to witness the efficacy of the cable, or go down into the colliery; if I choose to risk my money in a patent, that is my look-out; I cannot agree with Mr. Aikin as to the expense of obtaining a patent being small; I think it should be a pretty heavy sum, and I would have the inventor protected from the moment he made his affidavit and petitioned for his patent, but I would make the first payment somewhat heavy, to show that he was in earnest; I would give him six months to deposit his specification, and I would also give to the same commissioners, in case that specification appeared defective, and they thought *bona fide* it was an error of his in making the omission the power of allowing him to amend the specification.

To whom would you have the inventor apply originally ?—To the Attorney General or to the Secretary of State.

Would you abridge the period between the application for the patent and the sealing of it ?—The period would not be very material, if the patent right was protected from the time of petitioning for the same ; the fees payable at the Privy Seal Office and the other offices may be as well all paid at once.

Supposing the expense of taking out a patent to remain as it is, is it your opinion that it would be better that the party applying should at once pay that sum than that he should pay it through the variety of offices through which he now pays it ?—Yes.

Would you increase the fee upon patents ?—Yes ; I would have it such a sum as would pay the commissioners ; there is no reason why they should not be paid by the patentee ; he ought to pay the expense of the commission by which he is protected ; I think that the commissioners should be the ultimate judges ; I would never have the validity of a patent tried by a jury ; on a trial witnesses come and state, that they have read the specification, and that the thing can be carried into execution in the easiest manner ; then others, on the opposite side, depose that it cannot be done ; and the judge knows nothing about it more than the witnesses state, and the jury less ; that is the way in which patent rights are tried ; we are just on the eve of closing Mr. Howard's patent, and we are going to have three issues tried, which will cost a thousand pounds at least, perhaps twice that sum.

When you say you would rather increase than diminish the fees, do you allude to the separate fees for the three countries, or would you make one patent to stand good for all the three countries, putting one sum upon the whole ?—I see no objection to that, except that the fees belong to the different Secretaries of State of England, of Ireland, and of Scotland, they must be provided for and apportioned somehow or other ; one patent would be just as good if it extended to the three kingdoms; but my attention has not been before called to the subject.

From your experience, do you not believe that any patentee who is sincere about the sort of patent that he means to take out, would rather pay double the fees that he does at present, if he could be allowed to pay them all at once and instantly secure his patent right, instead of being detained three months, during the whole of which time he is never safe?—I think the present delay is decidedly objectionable; it depends upon the illness of the Chancellor, or his absence from business, or the Attorney General's engagements; and I think a patent ought to be protected from the moment the person presents his petition.

Are you prepared to suggest any plan for the composition of such a commission?—I think it should be composed of chemical men, and men acquainted with mechanics, and a barrister.

Would the decision of such a tribunal give general satisfaction?—I am not sure that it would, but it would be a more sensible one than the present; and I am sure the present mode never can give satisfaction. I quite concur in the suggestion Mr. Aikin made as to protecting improvements after the patent is obtained, because at present if you deviate in consequence of subsequent improvements very considerably from your specification, a judge will be very apt to say you are not working yourself on the patent you have got, and hence infer that you are to be taken as admitting it does not answer the end intended. If those subsequent improvements, as they were *bona fide* made, were allowed to be appended to the specification, so as to run concurrently with the patent, it would be good for the public and good for the patentee.

Would you make it compulsory upon him?—No, I would make it permissive; and in doing that it should protect him. With regard to Mr. Aikin's proposal of keeping the specifications secret, I think there would be more mischief done by close specifications than by open specifications.

The Committee have been informed that cases occur not unfrequently in which for the first ten years of a patent very little profit is derived from the invention, but that during the last three or four years it begins to be very beneficial; in such cases as those would you recommend a power of extending the patent?—I would in all cases leave it to be extended for another seven years; at present we must go to Parliament to get it extended, which is very expensive.

To whom would you give the power of extending it?—A commission of which I would have the Attorney General at the head.

It has been stated, that if a man has obtained a patent for an invention and not carried that invention into effect, it would be desirable to set that patent aside after three years of non usage of the invention; do you consider that there would be any advantage in that?—I think it would be for the benefit of the public that it should be so.

You consider it inconvenient to the public that patents should be kept in suspence for inventions that are not used?—Certainly.

Are you satisfied in your own mind that great inconvenience would result from considerably reducing the expenses now necessary for taking out patents?—I am quite satisfied about it, even with the present expense there are so many trifling patents taken out. If the fee was much higher, parties that are now taking out patents for little speculative things that do not answer, would not take them out. They act something like the dog in the manger; they prevent the public from benefiting by the invention, or improvements on it for fourteen years and yet do not benefit themselves.

Do you think that one patent should extend to the three kingdoms?—I rather think it should.

Do you not believe that many persons conceal their inventions only because if they go for a patent they must give it in such a way to the public, as that others can instantly pirate them, and that men work in private in preference?—I think it is very likely, but I do not know it of my own knowledge.

Can you give the Committee any idea of the average expense of protecting a patent?—It is very uncertain; the patentee files a bill in Chancery for an injunction, on the hearing of which the Chancellor either retains the bill for a year, leaving the plaintiff at liberty to bring an action, or directs issue, in either event a trial at law is the consequence, the expense of which is very uncertain, but very great, and after the trial the party, if successful, has again to return to the Court of Chancery, and obtain a reference to one of the Masters to inquire into the profits made by the infringement, after which the cause comes on for further directions and is finally disposed of.

Mr. Wm. Newton called in; and examined.

WHAT is your profession?—I am a patent agent, and machine draftsman.

Do you conceive that much inconvenience arises to a patentee, from the length of time that elapses between his application for a patent, and obtaining the Great Seal to it?—There are many inconveniences arise from that circumstance; frequently his invention is superseded; that happens from various causes; one cause I consider to be the irregularity with which the documents are delivered from the Secretary of State's Office. I have frequently known that those papers which have been sent first, have been delivered last; that many boxes of papers have been sent to the King, and retained for weeks together; and I have known instances in which the warrants and the bills have been kept for some months under peculiar circumstances, His Majesty either being indisposed or greatly occupied, I presume, with other business. During the whole of that time the patent is stationary, and the patentee has no protection till the Great Seal is appended to the patent.

What is the usual time that elapses before the patent is sealed?—I can scarcely state any usual time for the delivery of the papers from the King; we begin to look for them after a week, but it is very seldom that we get them so soon. I refer to the two stages of the patent, the King's warrant, and His sign manual to the bill. There is another thing which is productive of inconvenience, which is the repeated journies that the agent's clerk has to those offices, which induce him frequently to stay away three or four days, not apprehending that anything will be ready, and some other agents perhaps, more vigilant than himself, get their papers forward; and I have known instances in which patents have jumped one over another, to the prejudice of the first applicant.

How would you propose to secure the patentee from piracy, during the time between his first application and the sealing of the patent?—I think it would be very desirable to append a sort of specification to his petition, in the first instance; and that from the date of presenting that petition he should have the priority of right.

Then you would not have him apply till he had matured his invention?—I think it is very objectionable that a man should apply for a patent upon a vague idea, which he has not at all matured. It is frequently the case, that he has to make out an invention about the time that his specification is due; in fact, in many instances the subject is not absolutely invented till within a day or two before the inrolment of the specification.

Does not that happen from the circumstance that the inventor is afraid of being forestalled?—Frequently so; I have known many instances in my own practice, of an inventor declining to pursue any experiments, and waiting till the last moment, till another person has specified an invention bearing a similar title. In one instance I travelled from Nottingham to London on purpose to see a specification that was inrolled on a certain day, not daring to inrol the specification I was engaged upon, till we had seen that which had the precedency. Ours was due the next day.

Is not a patent frequently vitiated by the disclosures of workmen?—If the workmen are not faithful to their employer, it is; but the mere exposure to workmen, I consider to be experimenting, and in consequence would not vitiate the patent; but advantages may be taken by workmen, and the thing may be communicated elsewhere, and in some cases that has been done and the invention publicly used, before the Great Seal was appended, so as to destroy the patent.

How would you remedy that?—By the mode which I proposed, that when you present your petition, you shall deposit a specification incorporating the leading features of your object, what one may call the principles, sufficient to render it obvious that you have a certain intention, that you mean to do so and so.

Do you conceive there would be any difficulty, when the inventor afterwards proceeded to give in his perfect specification, in identifying the thing which he should then describe with the original draft of it?—I should think if there was any mode of examining and approving this ultimate specification, the correspondence of the two would be evident, and it should be altogether rejected if it was not upon the principles of the former one.

Do not you think there would be great difficulty in identifying the description given in the last specification with the original draft?—That would depend upon the pursuits of the persons to whom it was submitted; a board constituted of gentlemen versed in mechanical matters, would see at once whether the second specification followed entirely the principles set forth in the first.

Would it not be very easy, in the first instance, to give in so general a description as to include a vast variety of particular descriptions that might be suggested by him afterwards?—It would be possible to do so, but I should think such a specification would be rejected at once as not conveying suitable information to grant a patent upon.

Then you would propose that the specification, in the first instance, should be precise?—Yes; I think it should be a preliminary specification, such as I have myself tendered to the French government.

Are you acquainted with the French law of patents?—I am tolerably well acquainted with the progress of patents in France.

Will you state what is the course of proceeding in France, on applying for a patent?—The course of proceeding in France is to deposit the specification with the petition and other papers called the *Procès Verbal*, which immediately upon depositing you take a certificate for; you then pay one half of the government charges, which vary according to the length of time for which you solicit your patent; you immediately take the certificate and get it inrolled, for which you pay a small sum, and that gives your patent precedency of all others that shall follow, even if another for the same subject came in the course of an hour; and that is the reason why it has been deemed expedient sometimes to deposit a preliminary specification which shall not contain all the particulars that might be ultimately called for.

How soon is the party obliged to put in his ultimate specification in France?—It is possible that they would grant the patent upon that preliminary specification, if he did not take care to have a better one inserted, but if the consultive board, upon opening those papers, which are all sealed till they come before them, find that the specification is not satisfactory, they call for further information, and then a more perfect specification is delivered.

When you say if the specification is not satisfactory, do you mean, if it is not sufficient to describe the invention?—Exactly.

Is there any examination, by scientific persons, of the specification, with a view of ascertaining whether it gives a correct description of the invention?—There is an examination before scientific persons, who constitute what are called The Consultive Board, and that examination has several objects, perhaps not the primary one of observing whether the specification is full and complete; but one object is to ascertain whether the invention is original so far as they know. If it has been published in any printed book, they will refuse the grant, and on refusing the grant will return the fees paid.

Does not the other point come under their consideration?—It does certainly; but I should suppose where there may be many patents, that point would be very likely to be slighted; because sometimes I have myself inrolled a specification that has contained a very long account of a very elaborate machine, and a great many drawings; and it would be very difficult for gentlemen to sit over those drawings and consider all the bearings of the different pieces of the mechanism connected with it; and therefore, I think, they would take it for granted that it is a correct description; it appears to be clearly described, and accordingly take it to be a good specification.

Are patents in France ever set aside after they have been granted, on the ground that the description is not sufficient?—I am not aware, but I should think it could not be so; because in France, a patent is open to have all improvements added and all amendments made during the whole period, upon paying a small fee; and perhaps a year or two after, when an inventor has made a sufficient number of experiments, he applies for a patent of *Prefectionment,* as they call it, and then he inrols his amended specification, and whatever the consultive board approves of, as falling within the range of the first claim and entirely belonging to it, they grant as part of the original patent, on paying a trifling fee.

Do you think that would be an improvement in the practice in England?—I think it would be highly desirable in England; because I have known many instances in which the patentee, not being able to pursue his experiments and construct his machinery before the inrolment of his specification, has ultimately found that he was deficient in parts, and has been obliged to go through the whole process of obtaining patents for the three kingdoms again.

Would you enable him, by application to the Patent Office, to add his new discovery to his former patent?—Certainly, I would.

And would you have it concurrent with the existing patent?—Yes; I will state an instance in point. A gentleman in Birmingham, has lately invented a very ingenious machine, for the manufacture of silk buttons, composed of course of many movements and parts; and one part of the process was to introduce small discs through a little opening like the opening through which you would push a letter into a box; he has now, half a year after the inrolment of his specification, discovered a mode of introducing slips of metal, which he can cut off in this machine without the difficulty of feeding in the discs, by hand, for which he has now been obliged to take another patent, which is not yet specified; and he is paying all the English fees again. It happened that he was enabled to put in an account of this invention into his Scotch patent; and his Irish patent, from the tediousness of the process of obtaining it, has not yet been granted; and therefore he will be enabled to incorporate both in one there.

With respect to the commission for the examination of patents in France, do you know how the board is constituted?—I believe, by appointment of the government; but that I am not positive of; I know that Monsieur Dupin, who is a well known philosopher, is a member of the board, because I have corresponded with him upon some points connected with the practice of the board.

Do you know whether the decisions of that board have been generally satisfactory to parties applying for patents, as well as the public?—I believe, they put the most liberal construction upon things, and they grant the patent statedly at the risk of the applicant, not holding themselves answerable for his representation.

Have you heard that any complaints have been made of partiality?—No; I think they would not be partial; there are too many of them to suppose that there could be any connivance that would be unhandsome; and I am not aware of there having been any complaints that were worth considering.

Do you consider that a board of that kind would be beneficial in this country?—I think it would, if composed of gentlemen who are not actually manufacturers or operative engineers; but who have been, and who are well acquainted with scientific matters.

Are there any French patents set aside on account of insufficiency in the description of the invention?—I should apprehend very few, in consequence of the ease with which a defect of that sort might be amended.

Supposing an insufficient description is given purposely, with a view of misleading the public, how is it likely to be amended?—Then I conceive that the parties could only maintain that as the matter of their invention which they have described. If they have described a great many other things which are of no use, or that are not new, that does not as in England affect the validity of the patent. If there are twenty things claimed in the patent, and nineteen of them should turn out to be old, the twentieth still stands its ground without overturning the patent, which I think would be exceedingly desirable here.

Is it not the practice in some instances in France that the specification should be concealed?—I am not positive upon that point, it is an expensive thing to gain access to a specification, but I have seen specifications through my agent, who has taken me to the office.

What is the expense of inspecting a specification?—Perhaps two or three pounds.

But you are not aware of any case in which the specification of a patent has been entirely concealed from the public?—I think I have heard of such things, but I am not competent to speak to the fact.

Do you think it is a common practice?—No, I should think not, as a number of the specifications of French inventions are published by the Society at Paris for the Encouragement of Arts.

Then the moment a man has made an application for a patent, his invention is secured to him?—He secures whatever the board chooses ultimately to grant to him from that moment.

Is there any precautionary step that a person can take in France before his views are completely matured, in order to secure priority?—Nothing whatever, but the preliminary specification which I have described.

Then he must in fact have gone through probably, in most cases, a course of experiments before he can put in a specification?—He must absolutely have accomplished something that looks like an invention on paper.

Do you think it would be expedient to mend the law in this country so as to make it similar to that of France in that respect?—I think it would.

Is it not generally understood that the French specifications are concealed?—I do not know what may be the common understanding; I know it is not the fact. I believe the specifications are not shewn but through a petition, and that causes the thing to be expensive.

Is the petition in most cases granted as of course?—I believe it is of course to a native, but not to a foreigner. I gained access to the specification of an invention which I was anxious to see, because the invention had been stolen from a printing machine which I sent over, and applied to another purpose, (a power loom,) and therefore I was anxious to see it in order that I might stop the same thing happening here in England, which I did when a patent was applied for here, for the improved power loom.

In the case of a patent being infringed where the specification is concealed, how is the satisfactory evidence given to the court as to what the original invention was?—I presume that the patentee produces his patent which has the copy of his specification appended to it regularly sealed and signed by the proper authorities.

In that case, does his specification at once become public?—I suppose it does.

In France, how many commissioners are there?—I do not know; there are, I think, ten or more.

Is it an answer to an objection against a patent in France, that the process has been examined by those commissioners, and that the patent has been granted accordingly?—The commission sit for the purpose of examining the petition and specification, and they report upon it; which report, if favourable causes the patent to be issued; but if unfavourable, from a defective specification, generally calls for further information.

Supposing a patent is attacked in a court of justice, is it an answer to that attack, that the commissioners have investigated it and have granted the patent, and that therefore any objection to it is precluded?—No; I believe the commissioners do not take any such responsibility upon themselves, and I do not think it would be expedient that they should do so; I think that that which the commissioners do is tantamount to that which the Attorney General here ought to do; he reports that he has examined this subject, and thinks it will be for the benefit of the country that the King should grant a patent; whereas we all know that the Attorney General is otherwise occupied, and that he is not at all acquainted with any more than the petition.

Then you conceive it is no defence to the patentee himself, to say, that this has been examined by the commission?—I think none at all; because, if it was, no patent could be overturned upon any grounds; for the commissioners having awarded the application, and a patent having been granted, would, upon those grounds, be estalished as a good one; whereas it frequently happens that, either because the thing has been used before, or has been published before, or upon some other ground, it is overturned.

Are patents ever overturned, upon the ground of their not being sufficiently described?—I think that never can be a ground, because it would be known in the progress of the investigation that such would be likely to be a ground of opposition to it, and the parties would take care to amend it.

Is that the case in England?—No, it cannot be the case in England; because, in France, the specification is always open, to have a rider appended to it, which is a further explanation of the matter; but in England you cannot alter a single letter which you may even have inserted in error; I have lately been obliged to go over a patent again, in which there was an error of a single letter only; it was the word *pressing* instead of *dressing*; and I have been obliged to solicit the patent again.

What expense might that have put you to?—The principal fees and stamps being allowed, I should suppose it will ultimately cost thirty or forty pounds.

Do you happen to know whether it is a bar to taking out a patent in France, if they know that that patent is already in existence in another country?—No, that is not a barrier to taking out a patent in France; there is a condition that, when you take out a patent in France, you shall not take out a patent any where else, or, if you do, your patent in France is vitiated; the same happens in all the other Continental states, but that is got over with the greatest ease, because you employ your agent, or your brother, or your friend; and so an invention runs through all the countries, beginning in America and coming to England, then Scotland, then Ireland, then France, Holland, Prussia, Austria, and Russia; and that is the course they generally take all the way, under different names, beyond England, Scotland, and Ireland.

Before what tribunal is a patent defended, when it is infringed in France?—I have understood it is before the Court Royal.

Is it tried before a jury?—I believe it is; but I am not sufficiently acquainted with the proceedings to answer that question.

Is the question referred to the commission?—No, to the courts; I know that, because the courts have differed as to the interpretation of the laws of patents; the court, in one part of the country, has decided one way, and the court, in another part, has occasionally decided in another; for instance, it was first considered that the publication of an invention which should invalidate a patent, must be in the French language; it was afterwards determined that, if it was published in any other language, and produced in France, it would vitiate the patent, and it was ultimately asserted (but I do not know whether it was established as the law) that the mere inrolment of an invention in another country, where it was open to the examination of the world, was a publication.

What is your opinion of the protection afforded by a caveat?—It affords scarcely any protection at all; it merely gives the party notice when any one else is applying for a patent for any thing that involves even the same sort of expression in it; for instance, if a man was applying for a patent for an improved loom for the weaving of fabrics made of fibrous materials, and he were to lodge a caveat; if somebody else were to petition for a patent for preparing or spinning fibrous materials, it is a hundred to one but that the other party would have notice, upon the words *fibrous materials*, though the things are totally dissimilar even in their objects.

Have you ever known a petition for a patent successfully resisted, in consequence of notice which has been given?—Yes, frequently, I have opposed patents myself, and they have been stopped upon producing sufficient evidence to the Attorney General or to the Solicitor General that we were in possession of the same secret; they would of course refuse to grant a patent to the petitioning party, on the ground of the invention not being exclusively in the possession of the applicant.

Can you mention any cases in which a patent has actually been refused upon such a ground?—Yes; I remember a patent applied for by Mr. Dickenson, for metallic buoys: Mr. Stebbing, of the dock-yard at Portsmouth, had the same invention, and he opposed him; and the patent was refused by the Attorney-General of that day.

At what time was that?—It was four or five years ago.

Is not a patent liable to be vitiated, if any part of what is claimed shall be proved to have been previously invented?—Yes; that is the misfortune of the existing practice in England; but I think it is extremely detrimental and hard.

What rule would you apply in such a case?—It arises out of the circumstance, that it is impossible for a person to know every thing that has been done, and therefore, through ignorance, claims that which has existed before; I should say, You cannot maintain this part of your invention; you cannot have an exclusive right to it; but do not let it interfere with the merits of other parts which are new combinations, unless it forms an essential feature of the invention.

What is your opinion of the present cost of obtaining patents?—I think it would be extremely desirable if it could by any means be reduced.

Are you aware of any case of rival patentees, in which one of the parties being unsuccessful has published the invention, and thereby prevented the other party from obtaining a patent?—I know such cases have existed, but I am not prepared to state the names, it is the natural consequence; I have known it often to have been threatened, that if such and such things are not done, I will immediately make public what I know of the matter; it has been done, perhaps, under circumstances rather of an aggravated nature, when parties have obtained the information surreptitiously, and have endeavoured to extort a something that they asked for; and I know that instances have occurred of floating caveats, for the purpose of picking up agency business, and getting a gratuity to suspend any further opposition.

Does that occasionally lead to compromise?—It has sometimes led to compromises of one sort or other.

What remedy do you propose for that?—The only remedy that I think can be proposed, is, depositing the specification at the time of the petition, and then allowing the parties to go into an investigation; in some of those instances, the opposing party had not the invention, but merely pretended to have something to annoy the other party. Where two persons are really in possession of the fact, I should think that an application to the board, if a board is appointed, would naturally stop the progress of the patent, because it would be impossible to enter into the question how you became possessed of it, or whether it was your own invention.

To what extent would you think it desirable to reduce the expense of patents?—I can hardly say; but they are more expensive in this country than any where else.

Do you know what is the expense of a patent in France?—It depends upon the length of time for which it is granted; the patents are granted for five, for ten, and for fifteen years; the Government duty upon a five years patent is 300 francs, about 12*l.*, exclusive of other fees, inrolments, and so on, which are trifling; for ten years, it is 800 francs, which is 32*l.*, and for fifteen years it is 1,500 francs, which is about 60*l.*

Do you approve of the plan of being able to apply for a patent for a shorter time than fourteen years?—I think it might be desirable, for there are many trifling things that pay the parties very well; little matters which they have suggested in the way of business, the stopper of a smelling bottle or some little thing of that sort, from the sale of which a great deal of profit has been derived; and I think fourteen years is too long to give security for such a thing.

Do you think that the great manufacturers would experience any inconvenience from the reduction of the expense of taking out patents, by their becoming exposed to frequent actions for making use of little trifling improvements for which people would take out patents, if the expense were materially reduced ?—That will cure itself, because if those little improvements are worth adoption, they should pay the ingenious man who has invented them, and if not, they have no business to make use of them.

Is not one of the objections to the expensiveness of a patent, that it is an unequal tax upon inventions, the expense being nearly the same upon one which is of a very ephemeral nature, as upon one which may be in full use for fourteen years, and bring in a large sum ?—Certainly, that is a reasonable ground of objection.

Do you think that the present cost is too much for a patent for fourteen years ?—Yes, I think it is, because it is a tax upon ingenuity in any shape.

Do you think that any useful inventions are now lost, in consequence of the expense necessary for taking out a patent ?—I am convinced there are many things lying dormant that will ultimately be lost, and many have been lost.

Do you think those are lost on account of the expense of taking out a patent, or on account of the uncertainty of the law if a patent is obtained ?—Both ; but the first consideration applies most immediately, because if a patent could be obtained at small cost, the uncertainty of the law in being unable to maintain it would be quite a secondary consideration, for they would only have lost the small sum they have paid.

Might not that operate also against the public, inasmuch as persons might be tempted to take out patents which they would afterwards not attempt even to maintain in a court of law, merely for the sake of any short-lived advantage they might derive from it ?—I do not think it would affect the public injuriously.

Are you aware of any patents that have been taken out where the invention has not been carried into effect ?— A great many.

Is there at present any means of setting aside those patents? —There is not at present, but I think it would not be objectionable to provide means, for I know some very valuable inventions that, if they were in the hands of the public, would spread far and wide, and be very useful, but for some cause or other they are lying dormant.

Is the expense of maintaining a patent right in a court of law very considerable?—The expense arises generally from a cause that cannot very easily be remedied; it arises from the number of professional persons that must be brought from different parts of the kingdom to speak to the points under consideration.

Do you think the present tribunal is a satisfactory one?—No, I do not, for this reason among others, that there being no existing basis of law, the dictum of the judge is one thing one day and another thing another; and they frequently make up their minds before they have heard the whole story, or they are biassed by the respectability of some evidence, and so without intending it pronounce a judgment that is highly objectionable.

Have you ever considered any means by which that objection might be obviated?—I really do not consider that the judges are the most competent men to decide such points, and certainly juries are not the most competent men to consider them, because when a party of ten or a dozen of scientific men in court cannot make up their minds upon certain points, how is it likely that a jury of inexperienced men should even understand the question.

Do you not think, that from the nature of the thing, a patent must be a butt at which every body must be allowed to shoot?—No, I should think not, it has unfortunately been so frequently.

How would you remedy the present unfitness of the tribunal for trying patent rights, would you appoint any other?—That is a question that involves a great deal of consideration; I do not know how to reply immediately to it, without some reflection; but I think another tribunal might be appointed that should be more competent, subject to a further appeal to the courts above, if the decision was deemed unsatisfactory.

Do you think a commission, consisting partly of lawyers and partly of scientific men, would be more satisfactory?—I think it would, if composed of both lawyers and scientific men, but certainly not of one class alone.

Should that commission, in your opinion, be a permanent one, or one liable to be changed?—It should be, to a certain extent permanent, because the parties should not be so far subject to be shifted from their stations as to feel that their decision might be reversed by another board who might be appointed in their place.

If a commission of that sort were appointed, would you give parties who were tried before it the right of challenge?—Certainly; I think that is a matter that we ought to insist upon as part of our liberties, because there might be instances in which a certain commissioner present might feel an interest. I have, in my recollection, one gentleman, who might very likely have been appointed upon such a commission; and who, in many instances would have been an exceedingly objectionable judge, a geutlemen who is not now living.

Do you conceive, that if such a commission were appointed, the expenses you have spoken of as incurred now upon trials before juries, might be lessened?—Yes, I think they might, but at all events the decision would be more satisfactory, there would be fewer witnesses necessary, because there are many legal points which it would not be necessary to prove in the way they are proved in our present courts of law.

Is it not the fact, that in France, persons having patents must work them within two years, or else forfeit the right?—Yes.

Do you think that lowering the fees considerably would much increase the number of patents?—I think it would.

Do you think it would be desirable to have patents for all sorts of small improvements?—I do not see any difficulty on the subject that would arise, because if those improvements were to be so trifling as not to be worth notice, they would sink into insignificance; and if they were good for any thing, the parties that introduced them would have a right to the benefit.

Do not you think that the existence of a great many small patents might operate as an impediment to the progress of other considerable improvements?—No, I do not.

Might there not be patents taken out for very small things, which might be applicable to larger processes?—I think the majority of small things would be little shopkeepers' fancies, little things that they would imagine that, if they had the exclusive right of selling for five or ten years, they should get something by.

In the progress of manufactures, has not it frequently occurred that workmen have made some small discovery that has facilitated the progress of machinery very much?—Yes.

If patents had been granted in such cases, would it not very much have impeded the improvement of those great machines, inasmuch as it would be almost impossible to know whether they had been previously used or not?—No, I do not think it would, because they would soon be known, and the parties who wanted them, would purchase them.

Then you think that for any discovery, however small, made by a practical workman, a patent might be granted without incurring the risk of any considerable impediment being thereby given to the future progress of machinery, or art?—I should think, in a general point of view, it could not be objectionable.

It has been stated to the Committee, that the cost of taking out a patent for fourteen years in England, Scotland, and Ireland, amounts to 350*l.*; how far do you think it desirable that that expense should be reduced?—There are several questions to be considered before that can be answered. I think, in the first instance, the cost of an English patent ought not to exceed 50*l.* or 60*l.* exclusive of what the patentee may have to lay out for drawings and description, which may be elaborate; then I think the patent for England ought to extend over the whole empire, and the colonies, if it is asked for; but then I do not know that it would be desirable, or that it would be necessary at least that a patent should extend over the whole empire at the same price, because there are persons interested in the procuring those patents in a variety of offices in Scotland and in Ireland, and unless some compensation could be made to them, I do not see that it would be quite correct to abolish them altogether.

Do you think that the whole cost of taking out a patent for England, Ireland, Scotland and the Colonies, should not exceed 50*l.* or 60*l.*?—I think that for England alone it should not exceed that sum, but I think where it is necessary to take it out for the three kingdoms, it might be fair to put on some additional fees, saving the government charges and the stamps; perhaps 20*l.* for each country, making the whole sum for the three kingdoms 100*l.*

Supposing you allowed a patent to be taken out for five years, what do you think should be the cost of that?—I should think that it would not be desirable to grant patents for the three kingdoms for five years, but if it were, perhaps I should say 60*l.* or for two of the kingdoms, 40*l.* or for one 20*l.* I give this merely as my own opinion, and without having considered the subject.

Are patents granted to foreigners without being naturalized?—They must be resident. There has a question arisen, whether a foreigner who is not naturalized, can hold his patent; a patent also may be granted to any person who receives a communication from a foreigner, providing that foreigner is residing abroad.

Do you see any objection to the rule of law, that a man cannot obtain a patent in England for an invention that has been communicated to him by one of his own countrymen?—I think there are objections to that, but not very weighty objections, because if the original inventor is in being, he can generally take out the patent, and the other pay for it on his assigning it to him.

If any agreement of that sort was made between them, and it could be proved, would it destroy the patent?—It would, as the law now stands; but I think it would be desirable to correct that, and it would also be desirable I think to receive communications from natural-born British subjects resident in any part of the world; now we cannot take a patent for any thing that is sent here by one of our own countrymen; if my brother was in France, and there picked up a valuable invention and send it to me, I could not take a patent for it, but if he were to hand it to my agent, who is a Frenchman, and he were to send it to me, I could obtain a patent for it, because it would be a communication from a foreigner residing abroad.

Does not the communication of any particular, however minute, from a person residing in England, set aside the patent, however important the object of it may be?—It does, because it is no part of that subject which was sworn to in the affidavit appended to the petition.

Do you think the law should be amended in that respect?—I do not know that it should, because some evils have arisen to my knowledge from that circumstance; for instance, a gentleman takes out a patent for a certain improvement connected with the clarification of gas, and another individual has by some means become acquainted with an object of the same kind which another party had in view, and he acting dishonestly, goes and sells that invention to the party who has secured his patent, who gets it entered in his specification, and destroys the claim of him who is to come afterwards; that has occurred recently.

Is not it fair that any individual who has made a small discovery, should have the right of selling it?—Yes, but it is not fair that it should be included in a specification which is to be the echo of another man's affidavit.

(To be continued.)

New Patents Sealed, 1829.

To John Moore, of Broad Wier, in the city of Bristol, gentleman, for certain new or improved machinery for propelling carriages; also for propelling ships, vessels, or other floating bodies, and for guiding propelled carriages and apparatus for condensing the steam of the steam engine after it has propelled the steam engine piston. 30th Sept.—6 months.

To William Rodger, of Norfolk Street, Strand, in in the county of Middlesex, lieutenant in the royal navy, for certain improvements in the construction of cat head stoppers. 30th Sept.—6 months.

To Thomas Banks, of Patricroft Within, Barton-upon Irwell, in the county of Lancaster, civil engineer, for improvements in steam engines. 30th Sept.—6 months.

To Paul Descroizilles, of Fenchurch Street, in the city of London, chemist, for certain improvements in apparatus for removing the down from cotton and certain other fabrics, by singing. 7th Oct.—6 months.

To William Church, of Heywood House, near Birmingham, in the county of Warwick, Esq. for certain improvements in machines for propelling vessels and other machines capable of being propelled by steam, and in boilers applicable to the same, and also to other purposes. 15th Oct.—6 months.

To William Church, of Heywood House, near Birmingham, in the county of Warwick, Esq. for certain improvements in or upon instruments for sharpening knives and other edge tools, and in the machinery or apparatus for manufacturing the same. 15th October—6 months.

CELESTIAL PHENOMENA, FOR NOVEMBER, 1829.

D.	H.	M.	S.	
1	0	0	0	☉ before the clock 16 *m* 16 Sec.
1	4	0	0	♀ *m* conj. with β in Oph.
3	4	0	0	☽ in conj. with β in Capri.
3	21	51	0	☽ in ▭ first quarter.
5	0	0	0	☉ before the Clock 16 *m* 14 Sec.
5	7	0	0	☽ in conj. with δ in Virgo.
6	0	0	0	☿ Stationary
9	0	0	0	☽ in conj. with *o* in Pisces.
10	0	0	0	☉ before the Clock 15 *m* 54 Sec.
10	13	46	0	Ecliptic opposition, or ● full moon.
11	15	0	0	☾ in conj. with ν in Taurus.
11	16	0	0	☾ in conj. with 1 δ in Taurus
11	16	0	0	☾ in conj. with δ in Taurus
11	21	0	0	☾ in conj. with *a* in Taurus
12	22	0	0	♀ in conj. with γ in Sagitt
13	17	0	0	☿ in conj. with κ in Virgo
15	0	0	0	☉ before the Clock 15 *m* 13 Sec.
17	18	0	0	☾ in conj. with ξ in Leo.
17	13	0	0	☾ in conj. with *o* in Leo.
17	20	51	0	☾ in ▭ last quarter.
18	4	0	0	♀ in conj. with 6 in Sagitt
18	23	0	0	♃ in conj. with β in Oph.
19	20	0	0	☾ in conj. with τ in Leo.
20	0	0	0	☉ before the Clock 14 *m* 11 Sec.
20	8	0	0	☾ in conj. with β in Virgo.
20	0	0	0	☾ in conj. with η in Virgo
22	0	53	0	☉ enters Sagitt
22	2	0	0	☾ in conj. with ʒ in Virgo
22	5	0	0	♀ in conj. with ψ in Sagitt
23	11	0	0	☾ in conj. with ϖ in Virgo.
25	0	0	0	☉ before the Clock 12' *m* 47 Sec.
25	3	0	0	☾ in conj. with γ in Libra
26	0	32	0	Eclipt. conj. or ● new moon
28	21	0	0	☿ in conj. with 4 ζ in Libra
29	0	0	0	♃ Stationary
30	0	0	0	before the Clock 11 *m* 5 Sec.
30	7	0	0	♉ in conj. with ϱ in Libra
30	9	0	0	☽ in conj. with β in Capri

☽ the waxing moon.—☾ the waning moon

Rotherhithe. J. LEWTHWAITE.

METEOROLOGICAL JOURNAL, FOR SEPT AND OCT. 1829.

1829.	Thermo.		Barometer.		Rain in inches.	1829.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low	High.	Low.			Hig.	Low	Hig.	Low.	
SEPT. 26	62	35	30,13	30,06		OCT. 11	59	47	30,22	29,69	
27	61	52	29,94	29,79		12	58	49	29,99	Stat.	
28	57	38	29,90	29,78	,1	13	54	44	29,98	29,61	
29	56	33	29,99	29,92		14	58	43	29,80	29,36	,125
30	57	31	30,16	30,08		15	47	32	30,12	30,16	,05
OCT. 1	61	35	30,16	Stat.		16	57	28	30,05	29,76	
2	59	35	29,99	29,94		17	57	42	30,06	29,98	
3	61	45	29,80	29,72	,375	18	62	45	30,06	30,04	
4	58	42	29,88	29,75	,3	19	64	44	30,02	29,90	
5	57	47	29,56	Stat.	,15	20	59	45	29,85	29,79	
6	57	37	29,61	29,59	,125	21	66	41	29,79	29,60	,125
7	41	32	29,51	29,39	,125	22	55	44	29,80	29,60	
8	46	29	29,86	29,71	,2	23	51	33	29,91	29,88	
9	48	29	30,26	30,11	,15	24	54	27	29,94	29,91	
10	58	25	30,36	30,30		25	54	29	30,19	30,03	

Edmonton. C. H. ADAMS.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. XXI.

[SECOND SERIES.]

Recent Patents.

To JAMES WILLS WAYTE, *late of Drury-lane, in the county of Middlesex, but now of Gough-street, Mount Pleasant, in the same county, printer, for " certain improvements in Printing Machinery."*—[Sealed 19th March, 1829.]

SPECIFICATION.

"MY improvements in machinery for printing, consist in the first place, in a new construction of printing press or machine, in which I employ two tables, each having its distinct form of types, for the purpose of printing both sides of the sheet of paper, called perfecting. These tables are supported upon vibratory arms, and are alternately brought up under a pendant platen, to receive the impression, by the agency of a rod connected to a rotatory crank. Secondly, in a new construction of printing press or machine, in which only one table and form of types is employed, vibrating upon arms between two platens which stand obliquely, the table coming in contact with the platens alternately. Thirdly, in a new construction of inking apparatus, which may be adapted to the table of a printing press of any of the ordinary constructions.

"My first mentioned printing machine is shewn in the accompanying drawings (see Plate VI.) in several figures, in all of which the same letters of reference point out similar parts of the machine. Fig. 1, is a side view of the machine in complete working order. Fig. 2, is a horizontal view, shewing the appearance of the machine from above. Fig. 3, exhibits the reverse side of the machine to fig. 1, the frame being removed to shew the working parts more clearly. This third figure represents the positions of the parts of the machine at the time that an impression is given to the sheet. Fig. 4, is a similar view to fig. 3, shewing the positions of the parts immediately after the impression is given to the sheet; the platen being raised for the purpose of allowing this table and form of types to pass away, and the other table and form to come up into its place for giving the impression to the reverse side of the sheet, which is turned over during the alternating movement of the tables.—*a* & *b* are the tables with the forms of type, each table being supported by the arms of the double-armed levers *c*, *d*, *c*, *d*. The tables are attached to these arms by hinge joints; and the double-armed levers, which are all of equal lengths, vibrate on bolts or shafts passed through their fulcrums at *e*, *e*, the tails of the levers having weights *f*, *f*, to counterbalance the tables.

"The crank *g*, to which the actuating power is to be applied, is connected to the levers *c*, by a rod *h*, and hence the rotation of the crank causes the double-armed levers to vibrate, and to carry the tables up and down in horizontal positions, always preserving their parallelism, as shewn by dotted line in figure 3. In order to raise and lower the platen *i*, parallel to the tables, the platen is suspended to the cross head of the press by double-jointed pieces, as seen at *j*, and is guided in its parallel movement by a longitudinal bar *k, k*, connected by a link joint *l*, to an upright standard *m*, at the feeding end of the machine, which is particularly shewn in figures 3 and 4.

" The sheets of paper to be printed are placed in a heap upon the feeding board *n*, and are slidden forward singly by the boy attending the machine, over the edge of the board, into a situation to be taken hold of by the springs, clips, or fingers *o, o, o*, mounted on a slight bar *p*, crossing the machine, and connected to the endless chains *q*, as seen most clearly in the horizontal view, fig. 2.

The construction of the clips or fingers is very simple; their upper chaps are formed by small pieces of thin steel plate *o*, fastened at one end to their bar *p*, which constitute the lower chap; on this bar they lay flat, and as the endless chains traverse the ends of these springs severally, come against small enclined planes *r, r, r*, affixed to the top rail of the standard *s*, which enclined planes raise the ends of the spring clips, or fingers, and when they have passed over the enclined planes they fall, and their ends take fast hold of the edge of the sheet of paper, ready to conduct it between the platen and table, to be printed.

The endless chains *q*, are carried forward through the machine by means of toothed gear, actuated by the rotation of the crank shaft *g*, seen in figs. 1 and 2. On the end of the crank shaft, a bevel toothed wheel *t*, is fixed, which takes into a pinion on the enclined shaft *u*, at the upper end of which shaft there is a similar pinion, which by mitre gear drives the toothed wheel *v*. This toothed wheel *v*, takes into a pinion *w*, on the axle of one of the conducting rollers *x*, seen crossing the machine in the horizontal view, fig. 2. The ends of this and the other similar conducting rollers have spear wheels, which take into the links of the endless chains *q*, and hence, by the rotation of *x*, the chains are carried forward.

When the machine is in operation, the crank shaft *g*, is driven by a uniform continuous rotatory motion; but as it is necessary that the endless chains conducting the sheets of paper should rest at intervals, while the impression is given, a portion of the teeth of the wheel *v*, are removed, by which means, though the wheel *v*, continues revolving uniformly, yet the pinion *w*, is allowed occasionally to remain at rest, in order to leave the conducting rollers and endless chains stationary, during the time that the impression is given.

Let it be supposed that a sheet of paper is now receiving an impression, the parts of the machine will be in the situation, shewn in fig. 3. After the impression is given to the sheet, the parts of the machine will assume the positions shewn in fig. 4. The crank and the rod *h*, coming into a right line, will then have pushed the arms *c*, *d*, which support the table *b*, beyond the perpendicular, and as they arrive at this position, the upright bar or lever *y*, locking itself to the arm *d*, through the agency of the catch and spring levers *z*, *z*, will be made to move the horizontal bar *k*, laterally, by means of the pin 1, at the top of the bar *y*, acting in the slot of the arm 2, which descends from the bar *k*. This bar *k*, is fixed to the platen, and it will be remembered, hangs at one end on the link joint *l*, hence as the bar moves sideways, it rises and lifts the platen off the table, as seen in fig. 4.

It may be here necessary to observe that the impression just given by the table *b*, is that which prints the reiteration, or second side of the sheet, called perfecting. One of the sets of fingers are at this time, by the sliding of the bar, passed over the enclined planes described above, and shewn in fig. 4, and are made to take hold of the edge of a sheet of paper from the pile, ready to be drawn in for receiving the impression of the table *a*.

The teeth of the revolving wheel *v*, now taking into the pinion *u*, the endless chains are moved forward, and the fresh sheet is brought under the platen, while the printed sheet is carried along the endless web 3, and discharged on to a receiving board placed in any convenient situation; the spring clips opening as they pass over small enclined planes at 4, in a similar way to that described above. In order that the platen may be raised and lowered by a small force, a counter-balance weight 5, is affixed to a lever, and connected to the platen through the perpendicular rod 6.

The reciprocating movements of the tables *a*, and *b*, having been described as effected by the rotatory crank, and its connecting rod *h*, I now proceed to point out the means by which the forms receive the ink, previous to giving each impression. At each end of the frame of the machine, there is a trough 7, containing the ink: to each of these is appended a ductor roller, as in other printing machines, for the purpose of giving the necessary supplies of ink; 8, 8, are the receiving rollers, the pivots of which are mounted in small levers 9, 9, having a spring behind each, for the purpose of keeping the receiving rollers in contact with the distributing rollers 10, 10. The levers and the distributing rollers are mounted in the side rails attached to the tables, and as the tables come down into their lowest situations, as at *a*, fig. 4; the tail of the lever 9, strikes upon a small stud, which brings the receiving roller 8, in contact with the ductor roller. At this time the roller 8, receives its supply of ink, and on the rising of the table, the spring causes the roller 8, to come again into contact with the distributing roller 10.

In order that the ink may be uniformly spread upon the distributing rollers, they are kept continually revolving by means of an endless band 11, 11, passed over pullies at their ends, and over a pulley 12, near the middle of the machine, which band is kept tight by a tension pulley 13. A pulley fixed on the same axle as 12, carries a band from a similar pulley 14, on the crank shaft, and thus by the rotation of the crank shaft, the distributing rollers are kept continually revolving.

"The rollers 15, 15, which give ink to the form on the table *a*, turn loosely in the pendant guides 16, 16, and consequently, as the vibrating table *a*, rises and falls, as shewn by dotted lines in fig. 3, the rollers will pass over the form and supply it with ink. When the table has risen to its highest position, the rollers 15, 15, will bear upon the distributing roller 10, and thence obtain a fresh supply of ink. The form on the table *b*, is inked in precisely the same way as *a*, therefore a repetition of the description is unnecessary.

"After the first impression has been given to the sheet introduced under the platen by the spring clips or fingers, they in their progress reverse the sheet to receive the second impression, and then discharge it as already explained. A frisket or tapes may be suspended to the under side of the platen, for the purpose of keeping the sheet close to the blanket, which blanket is kept in tension between two rollers, and its surface may be shifted by an endless band and pulley, connected to one of the spur wheels, or by any other convenient means. The method of adjusting the impression is by sliding wedges in the cross head, as in other printing machines.

"The printing press or machine in which only one table is employed, vibrating upon arms between two platens, is shewn at fig. 5; *a*, is the crank shaft, driven by any adequate power; *b*, the crank; *c*, the connecting rod, attached by a joint to the vibrating frame *d*, *d*, on which the table *e*, and form of types is placed, with a balance weight *f*, attached to an arm at bottom. The ends of the table on the frame *d*, as it vibrates, alternately strikes against one of the levers *g*, *g*, at the extreme ends of which levers there are joints *h*, *h*, connecting them by the bars *i*, *i*, with the platens *k*, *k*; the platens being suspended by double jointed pieces *l*, *l*, in a similar way to the machine above described. This action of the table and brings the oblique platen down to give the impression; on the return of the vibrating frame and table, the counter weight *m*, raises the lever *g*, and causes the platen to be lifted to its former situation.

"The inking apparatus in this machine is in a great measure similarly constructed to that above described, and as the table passes to and fro, the rollers *n*, *n*, pass over the form and ink the types.

"The sheets to be printed in this machine, are introduced by a series of tapes passing round an endless blanket, as employed in many other printing machines; the tapes and blankets receiving their motion from a rigger on the crank shaft. As this machine is calculated to print with great rapidity, several laying on tables may be employed.

"The inking apparatus, constituting the third part of my invention, is represented at figs. 5,* 6, 7, and 8, in which corresponding letters point out the same parts in all these figures. Fig. 5,* is a side view, fig. 6, a top view, and figs. 7 and 8, end views. The apparatus is mounted on a frame or standard *a, a, a,* and is to be placed on the off side of the table of a printing press, having the form of types, as at *b, b.* The duct or trough, containing the ink, is shewn at *c,* from whence the ink is taken by the ductor roller *d,* and transferred to the messenger roller *e,* which carries it to the receiving roller *f,* when the carriage runs out; *g, g, g, g,* is a light carriage or frame, supporting the axles of the two inking rollers *h,* and *i,* and the messenger roller *e,* which is shewn detached at fig. 9. This carriage runs upon four wheels on the two side railways at the top edges of the frame or standard *a.* Motion is given to the carriage by a weighted cord or gut *k,* passing over a pulley and round a barrel *l,* from which barrel another cord or gut *m,* is connected to the rounce *n.*

" The rounce is to be wound up by a boy, or other convenient means, which by the same operation gives motion to the distributing roller *j,* by a cord and pullies; the barrel *l* turning loosely upon its spindle during the winding, is then locked to the spindle by a catch acting in a notch at top of the barrel. The weight is by this means retained in its elevated position until the pressman lifts the tympan, when the tail or lever at the bottom of the tympan strikes against a small weighted lever *o,* at the side of the standard. This lever is connected by a rod *p,* to a small lever *q,* which carries a pall, taking into the ratchet wheel on the axle of the ductor roller *d,* and thereby imparts the necessary movement to the ductor, and at the same time depresses a pall or catch *r,* which held fast the frame or carriage *g.* The frame or carriage now being at liberty, the weight *k,* descends, turning the barrel *l,* and the spindle locked

locked to it; on the top of which is a spur wheel *s*. This spur wheel and another of similar diameter *t*, are embraced by an endless chain *u*, *u*, in which a stud *v*, is fixed, working in a slot at the back part of the carriage or frame *g*, and thence, by the rotation of the barrel *l*, and spindle, and the spur wheel *s*, the carriage, with the inking rollers, is suddenly projected over the form of types, as shewn by dots in fig. 6, and instantly brought back again. The weight being now wound up again, prepares the force by which the carriage, with the rollers, may be projected forward for another inking, in the way above described.

"In order to prevent the ink gathering on the rollers, and delivering in stripes, a lateral movement is given to the distributing roller, by means of a barrel *w*, with an inclined groove which receives a stud on the under side of the frame of the distributing roller, this barrel deriving motion from the lever *o*, on which the tail of the tympan acts.

"Fig. 10, represents another method by which a press of the ordinary construction may be altered, and furnished with a self-inking apparatus; *a*, is a stationary table with the form of types; *b*, is a carriage, in which the inking rollers *c*, *c*, are mounted, and also the platen *d*, turning upon pivots, or an axle. At one end of this axle, a toothed segment *e*, is affixed, taking into a rack *f*, which must be fixed to the table, or to any other stationary part of the press. To the ribs or frame of the press two spur wheels *g*, and *h*, are attached, carrying the endless chain *i*, *i*, *i*. This endless chain is connected by a stud to the carriage *b*, which runs on rollers upon the railway *k*. Now supposing the rounce handle *l*, to be turned, the carriage will be brought forward, conducting the inking rollers over the form, and also the platen *d*, which by the action of the toothed segment in the rack is turned upon its axle into a horizontal position over the types, ready to receive the power which gives the impression. At this time the inking rollers *c, c,* will be brought over the distributing roller *m,* and they will receive their supply of ink in the manner above described.

" Figs. 11 and 12, shew a plan and elevation of a mode by which the long ductor roller and ink trough, described in the former figures, may be dispensed with; *a,* is a small ink ductor with a trough attached to it, placed at one end of the framing of the inking apparatus; *b,* is a small roller attached to the end of the tympan frame, made of the usual elastic composition. When the tympan is raised, as shewn at *c,* in fig. 11, the roller *b,* is then brought in contact with the ductor *a,* but when the tympan is laid down upon the form, the roller *b,* will be raised into the position shewn by dots at *d,* in the same figure; *e, e, e, e,* are blocks of wood or metal placed upon a bar at the off side of the press; these blocks being made adjustable to suit different descriptions of forms. On running the tympan in, the roller *b,* passes over the blocks, communicating ink to them, as shewn by dots at *f,* and in order to prevent the roller delivering the greater part of its ink upon the first two blocks, they are so arranged, that only one half of the width of the roller comes in contact with the two first blocks, the other half delivering its ink to the third and fourth blocks. These blocks are placed so as to come opposite to the pages of type, and the inking rollers in passing over the blocks take up ink in those parts only, so as to avoid waste. These blocks may be either placed on the bar, as shewn under the roller, or suspended above it, as may be found most convenient.—[*Inrolled at the Rolls Chapel Office, September,* 1829.]

Specification drawn by Mr. Newton.

To WILLIAM PARR, *of Union Place, City Road, in the county of Middlesex, Gentleman, and* JAMES BLUETT, *of Blackwall, in the same county, ship joiner, mast, block, and pump maker, for their having invented a new method of producing a reciprocating action by means of rotatory motion, to be applied to the working of all kinds of pumps and other machinery in or to which reciprocating action is required or may be applied.* [Sealed December 22nd, 1828.]

THE subject of this patent is a repetition of the old plan which has been so often proposed as a new discovery, for converting a rotatory motion into a reciprocating motion, by the agency of two toothed wheels upon one axle, alternately taking into one of two racks in a sliding frame, and thereby moving the frame up and down, or to and fro. We need only refer to Apsey's patent, p. 82, and plate V. of this volume to explain the contrivance.

Upon a rotatory shaft driven by any convenient power, two spur wheels are placed and made to slide round freely; but a pall or catch affixed to each of the wheels is intended occasionally to drop into gear and lock its wheel to the shaft, by which locking the rotatory motion of the shaft is communicated to the wheel, and the teeth of the wheel taking into a rack on the side of a sliding frame, causes that frame to be slidden forward.

Supposing one of the wheels to be locked to the revolving shaft, when by its rotation it has moved the rack and frame a certain distance, then a pin strikes and raises the catch, and thereby unlocks the wheel from the shaft; at the same time throwing the catch of the other wheel into gear and locking it: which wheel taking into the rack on the opposite side of the sliding frame causes the frame to be driven back again, that is, the reverse way. Thus by the raising and lowering of the palls or catches the wheels are alternately locked to the rotatory shaft, and the sliding rack-frame receives a reciprocating motion, which may be communicated to a pump for raising water or for any other purpose.

The only peculiarity connected with this proposed piece of mechanism is the position of the catch levers, by which the wheels are locked to and unlocked from the shaft, but as this object may be effected in a great variety of ways with equal advantage, we consider it unnecessary to enter into any further details. [*Inrolled in the Inrolment Office in Chancery, June,* 1829.]

To James Shudi Broadwood, *of Great Pulteney Street, Golden Square, in the parish of St. James, Westminster, in the county of Middlesex, Pianoforte Maker, for his invention of certain improvements in the Grand Pianoforte.*—[Sealed 9th April, 1827.]

The objects of the improvements which form the subject of this patent are to give strength to the framing of a grand piano forte, in order that the tension of the strings may be more effectually preserved under variation in the temperture of the atmosphere.

Round the curved side of the frame of the grand piano it is proposed that a metallic plate shall be fixed, to be called the string plate, into which the hitch pins are set, for the ends of the strings to be fastened to. This plate, which forms the first suggested improvement, is placed some distance above the sounding board, and is made fast to the side of the wood frame by very strong screws.

The frame work is further braced by metal rods extending from end to end of the machine, three of which have been employed before for that purpose; but a fourth is now proposed to be applied toward the base side of the instrument. It is fastened at each end, and supported in the middle by a perpendicular piece, which passes through an aperture in the sounding board, and is made fast to the bottom of the frame.—[*Inrolled in the Inrolment Office in Chancery, October,* 1827.]

To BENJAMIN COOK, *of Birmingham, in the county of Warwick, Brass Founder, for his having invented an improved method of making rollers or cylinders of copper and other metal, or a mixture of metals, for the purpose of printing calicoes, silks, cloths, and other articles*—.[Sealed 23d April, 1829.]

THIS invention is a mode of securing the copper cylinder or outer shell of a printing roller upon its mandrel or axle. If the copper cylinder or outer surface upon which the pattern or subject is engraved be permanently fastened to the steel mandrel or axle, it is necessary, whenever another pattern is wanted, to remove the roller, and to fix another in its place in the printing press: and when the pattern is done with, the surface is taken from the roller, by turning away the metal, which reduces its diameter, and consequently produces great trouble in adjusting it again in the press. To obviate this inconvenience, it has been found desirable to adopt shells of copper, or tubes with engraved surfaces, which may be slidden off the mandrel at pleasure, and others attached with new subjects; but the modes of fastening these shells by means of nibs and slots (see Attwood's Patents, Vol. VII. page 285, and Vol. X. p. 307, of our First Series) has been attended with considerable expense and difficulty.

The present invention is an improved mode of fastening these shells on the mandrel, and consists as follows :—

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"My invention consists, first, in the novel form which I give to the mandrel or axle on which the cylinder or outer shell of copper or other metal or alloy is mounted; and secondly, in the internal form or shape of the copper or other external shell, and the way or method employed for so forming it.

"Instead of making the mandrels or axles of my improved printing rollers circular, that is of a cylindrical form, and slightly conical, which is the way they have been made heretofore, I now shape the mandrel of an elliptical form, or otherwise eccentric, or cylindrically rose, shaped, and slightly tapered or conical, which may be done by turning it in an oval or eccentric lathe, or by any other convenient means. Having prepared cylindrical ingots of copper, brass, or other proper alloys, of suitable lengths and diameters, a cylindrical hole is to be bored, drilled, or otherwise formed, through the axis of each ingot, leaving a small shoulder or inwardly projecting ring at one end, to act as a stop against the mandrel when drawing the ingot down, that is, shaping it to the form and size required.

"I then introduce the mandrel into the hollow ingot, which is to form its shell, and place them in a draw bench or other suitable machine, and draw the external surface of the shell, perfectly cylindrical, through holes or draw plates, to the dimensions I wish; which causes the shell to form itself internally to the elliptical or eccentric figure of the mandrel, and when so fitted and turned truly cylindrical, and polished on the outer surface, this constitutes my improved printing roller.

"The mandrel on which the copper or other shell has been drawn, as above described, may have *journies* turned on it, and be employed as its working axle in the printing press; but if not so used, all the axles or mandrels must be formed of exactly the same figure and dimensions as the original mandrel, in order that any number of external shells may fit in common upon them, for changing the patterns. The designs or subjects employed for printing are of course engraved on the polished surface of the external shells in the same manner as is now usually adopted for printing calicoes, silks, cloths, and other articles.

"Lastly, I do hereby declare, that my improved method of making rollers or cylinders of copper or other metals, or a mixture of metals, for printing calicoes, silks, and other articles, consists in the above described employment of elliptical mandrels or eccentric axles, on which the copper or other shells are formed, and fitted as aforesaid, and in the means employed for fitting exactly the inside of the ingots of copper, brass, or other alloy, to the mandrel, as above described.—[*Inrolled in the Petty Bag Office, October,* 1829.]

Specification drawn by Mr. Newton.

To William North, *of Guildford Place, Kennington, in the county of Surrey, Surveyor, for his having invented an improved method of constructing and forming ceilings and partitions for dwelling-houses, warehouses, workshops, or other buildings, in order to render the same more secure against fire.*—[Sealed 4th July, 1829.]

The object of the Patentee is first to produce a fireproof tile by the combination of such earthy materials as fire will have little or no effect upon; and secondly, the application of such tiles to ceilings, wainscots, walls, and partitions, in order to render buildings impervious to flames.

The proposition does not appear to possess any great degree of novelty, but without doubt would in many cases be effectual, and is therefore to be recommended, as a simple, cheap, and convenient method of impeding the ravages of fire.

The Patentee describes his invention in these words:—"My improved method of constructing and forming ceilings and partitions for dwelling houses, warehouses, workshops, or other buildings, consists in applying, fixing, and retaining upon or against the woodwork of such ceilings and partitions, certain flat tiles, which have been previously moulded, and formed of a composition, which, when set and become dry, will sufficiently resist the action of fire.

"To make these tiles—take the dust of Bath stone obtained from the chipping and refuse small pieces made by masons in working such stone; grind the same to powder by a suitable mill, of the kind called runners, on edges, or rolling stones turned by a horse or by other mill work. With the said dust of soft Bath stone, mix half as much by measure of Dorking quick lime, incorporating the lime and stone dust well together in a dry state; and to the mixture of quick lime and stone dust add, half as much by measure, of plaster of Paris.—Then mix the materials well together, and beat up the composition with as much water as will give to the same the consistency of soft mortar. This composition, when well worked, is to be put into moulds and spread out in smooth layers, in the form of tiles, which if the materials are good and well mixed, will soon set hard enough to be removed from the moulds, and set up on edge to dry.

"The composition is therefore two parts by measure of Dorking lime, three parts by measure of plaster of Paris, and four parts by measure of dust of Bath stone.

"The moulds for forming these tiles are prepared on the horizontal surface of a flat table or work-bench, which is made very smooth, and long straight rails are fixed thereon parallel to each other, at such distances apart as to leave a clear space between them, equal to the intended length of the tiles, usually about twenty-four inches; other shorter rails are applied across between the long rails, their ends being fitted into notches cut in the long rails, the cross rails leaving clear spaces between, equal to the intended width of the tiles, usually fifteen inches.

"The thickness or height that all the rails rise up above the surface of the table, is equal to the intended thickness of the tiles, usually one and a quarter inches; each of the rectangular spaces being thus bounded on four sides by the rails forms a mould.

"The interior edges of the bounding rails are made to overhang on one side and one end, and to underhang at the opposite side and end of the same mould, in order to form the tiles with bevelled or rebated edges, that they may fit one to another by overlapping.

"The inside of each mould is smeared with oil, and the composition being well mixed up to a consistency of soft mortar, is filled into the spaces between the rails; and iron staples, which are for the purpose of fixing and suspending the tiles, are then imbedded into the soft plaster near to the edges of each mould. The staples are pressed down in contact with the boards of the table, but do not stand up high enough to reach through the thickness of the tiles within about one eighth of an inch.

"The composition must be well spread within the mould, and completely filled up to the edges of the rails with a plasterer's trowel, or other suitable tool: the upper surface being worked very smooth, in order to give a finish to that side of the tiles which is to be downwards, if they are applied for a ceiling, or outwards, if they are applied for a partition. And if it be required to give the outside of the tiles a finer surface, a thin layer of fine plaster may be spread over the same, before the mass of the tiles are set.

"If the lime and plaster are of good quality the tiles will soon set in the moulds, and then one of the long rails is taken up off the table, and all the cross rails are removed; and also by rapping upon the boards of the table with a hammer, in the spaces between the tiles, the jarring will cause the boards to detach from the undersides of the tiles, leaving them loose on the table, from which they may be removed and set edgeways to dry and harden ready for use.

"The oil which was applied upon the boards of the table, and the edges of the rails which form the mould, before the composition was filled in, by filling up the pores of the wood, facilitates the separation of the tiles from the boards and rails.

"The width of the tiles must correspond with the distance between the joists or pieces of quartering, or other woodwork forming the framework for the ceiling or partition; and the tiles are to be applied against the woodwork, so that the sides in which the staples are provided may correspond as nearly as may be with the edges of the joists or pieces of wood framing; and a small iron hook, bent like the letter L, is inserted with its short end into each of the staples, and then the longer end, applying against the sides of the piece of wood, is fastened thereto by a nail, or two nails if need be; and by the said hooked or L piece the tile is fastened against the wood.

"The first row of the tiles which is thus fixed or applied, may require staples at the two opposite sides of each tile, in order to apply four hooks to fasten each tile; but when one row of tiles is thus securely fastened, the overhanging edges of those tiles will support one edge of the succeeding row of tiles, whereby two staples and two hooks to each tile will be sufficient to fasten them securely in their places. Or instead of four staples and four hooks to each of those tiles, that are put up in the first row, the first edges may be fastened by nails or screws, put through the thickness of the tiles into the wood behind or above the tiles; also the last row of tiles which is put up must be fastened by means of nails or screws, put through the thickness of the tiles into the wood behind or above the same, and the heads of such screws or nails, being countersunk deeply into the thickness of the tiles, may be concealed by filling up with the composition whereof the tiles are made, or with plaster.

"For forming ceilings in which there are large and deep girders, those girders may be encased or enclosed with tiles of a suitable width; those at the underside of the girder having four staples in each at the opposite edges, for the reception of as many hooks or L pieces to nail up against each side of the girder. The edges of the tiles should overhang or project beyond the width of the girder at each side, as much as to afford a lodgement for the lower edges of other narrower tiles, which are applied at the sides of the girders, and may be fastened thereto by nails or screws put through the thickness of those tiles into the wood; the upper edges of the narrow tiles fit up close beneath the tiles of the ceiling.

"The tiles in each succeeding row or course that is put up are made to break joints, by putting up a half tile at the beginning of every other row or course next to the wall, or next to the girder, and a whole tile at the beginning of every intermediate row or course.

"The tiles when dry and ready to pu tup, are easily cut to any dimensions that may be required for filling up the spaces at the beginning and end of each surface in a ceiling or partition.

"The tiles having bevelled edges which overlap each other, leave no direct fissures through which flame or fire can penetrate, and by fixing one row of tiles with overhanging edges upon or behind which the underhanging edges of the next row are inserted, the latter edges are thereby confined and retained in their places, the opposite or overhanging edges of the same tiles being fastened by means of the hooks and staples."

The Patentee concludes by saying, "My invention consists in the hereinbefore described method of fixing such tiles, viz. by inserting staples into the tiles during the operation of moulding them; by placing such staples in suitable positions to receive hooks or L shaped irons, for the purpose of fastening the tiles to the wood-work; and also in forming the edge of each tile in which there are staples overhanging, and the other or opposite edge under hanging, in order to interlock and fasten behind the adjacent edge of the tile next to it."—[*Inrolled in the Inrolment Office in Chancery, September,* 1829.]

To DONALD CURRIE, *of Regent-street, St, James's, in the county of Middlesex, for his method of preserving Grain and other vegetable and animal Substances and Liquids.* [Sealed 21st January, 1828.]

THE object of the Patentee is to prevent the decomposition of vegetable and animal substances by removing the oxygen of the atmosphere from them, and substituting in its place an atmosphere of carbonic acid gas.

The substances to be preserved, whether vegetable or animal, are to be placed in close receptacles, such as vaults or tanks; the atmospheric air is then to be extracted from such receptacles, and carbonic acid gas introduced, which being heavy will readily insinuate itself into every cavity of the vessel and rest upon the top of the goods deposited therein, and by that means prevent the re-entry of atmospheric air containing oxygen, in the absence of which the decomposition of those substances could not take place.

The carbonic acid gas may be obtained by any of the known modes, such as the burning of charcoal, or the fermentation of liquors, and when the articles, such as fruits, are preserved in glass bottles, the corks will likewise be prevented from decaying by the gas within.

The Patentee has not described any particular apparatus or mode of performing this operation, which in itself is certainly not new, we are therefore unable to point out what may be considered as constituting the essence of this invention. [*Inrolled in the Inrolment Office, in Chancery, July,* 1828.]

To Jane Bentley Lowrey, *of Exeter, Straw Hat Manufacturer, for certain improvements in the manufacturing of Hats and Bonnets.* [Sealed 25th March, 1828.]

The subject of this patent is a mode of combining with straw plait fillets of silk ribbon or other woven fabric. In order to effect this object the straw is platted in such a way as to form the appearance of a ladder; when this ladder of straw has been produced (the particular method of plaiting which is not described,) the fillet of silk or ribbon, or other fabric, is conducted through the ladder by means of a needle passing it alternately under and over the bars. The strips of straw plait thus prepared are then to be sown together into the forms of hats and bonnets in the usual way. [*Inrolled in the Inrollment Office, in Chancery, August,* 1828.]

To Josias Lambert, *of Liverpool-street, in the city of London, Esq. for his having invented an improvement in the process of making Iron, applicable at the smelting of the Ore, and at various subsequent stages of the process up to the completien of the rods or bars, and for the improvement of the quality of inferior Iron.* [Sealed 30th March, 1829,]

This improved process for making iron, that is for bringing it into a usable state from the ore, and of improving its quality in any subsequent stages of the process, consists simply in the employment of salt and potash in connection with the iron in the furnace.

The Patentee describes his invention in these words: "The improvement consists in the application of salt and potash mixed or combined together, to the iron ore, or iron in the blast furnace, the refinery furnace, the puddling furnace, or the balling or re-heating furnace, or in any other process to which iron in its manufacture is subjected, when considerable heat is applied.

"The proportions in which I recommend the salt and potash to be mixed or combined, are two parts of salt to one of potash; but should the proportions in some degree differ from that best adapted to the purpose, the useless portions will be dissipated in the process of the manufacture.

"The mixture or combination employed during the process in the blast furnace, should be applied at the time of the smelting of the materials, which are to produce the iron, at the rate of about fifteen pounds to the ton of iron; and may be introduced in proportionate quantities at the tunnel head of the blast furnace, either at intervals or with every charge of the materials, which are to produce the iron.

"If not used in the process of smelting, it may be applied at intervals to the metal during the operation in every charge in the refinery furnace, or in the puddling furnace, or to the iron in the balling or re-heating furnace, or in any other process to which the iron in its manufacture may be subjected, when considerable heat is applied.

"A proper proportion of the mixture to be used in the refinery furnace, may be at the rate of about twelve pounds and a half to the ton of iron; and in the puddling furnace, about eleven pounds to the ton of iron; but in the balling or re-heating furnace and other processes, the quantity to be applied must depend upon the quality, form, and substance of the iron, taking care that it is sprinkled over and amongst or brought in contact with the iron; the quantity will vary from about ten pounds to twenty pounds per ton.

"The quantity to be applied will differ in some degree, according to the quality of the materials or the iron; but the proportions above-mentioned, are about those proper upon the average.

"The process for the improvement of inferior iron, consists in the application of the same mixture in similar proportions to such iron, when subjected to considerable heat. For this purpose the mixture may be applied to the iron, and the iron melted in combination with it; it may be applied to the iron in any re-heating or other furnace, and the metal then be subjected to a red heat for a time proportioned to the quality, form, and substance of the iron, care being taken that the mixture be applied in contact with the heated metal; and for this purpose, if the iron be in the form of tubes, such as gun barrels, the mixture may be introduced into the tubes.

"Although I have mentioned common salt and potash as the substances to form the mixture to be applied, there are other compounds of sodium and patassium, which may respectively be substituted for those materials, which will have the same effect, so that the basis in the compounds are combined together, but I recommend the salt and potash as being the most convenient and economical.—[*Inorolled in the Inrolment Office in Chancery July*, 1829.]

In the Xth vol of our First Series p. 250, will be found the specification of Mr. Luckcock's patent, granted in May, 1824, for improvements in the process of making iron, which improvements he states consist in the employment of muriate of soda (common salt,) in that part of the process called puddling; and he further says that the chemical action of the salt upon the iron produces a great improvement in its quality.

EDITOR.

SCIENTIFIC ADJUDICATION.

Court of King's Bench, Westmister, 4th. Nov. 1829.
Before the Lord Chief Justice.

LEWIS *v* MARLING.

The subject of this action was the alleged infringement of a patent right. The plaintiffs, Messrs. J. and W. Lewis, of Brimscomb, Gloucestershire, are the proprietors of a patent granted in 1818, to themselves and their then partner, Mr. W. Davies, for "*certain improvements on shearing machines, for shearing and cropping woollen and other cloths that may require such process.*" The defendant, Mr. N. Marling, of Lodge Moor, near Stroudwater, in the same county, is a woollen manufacturer, in a very extensive way of business, and having employed in his works certain machines for shearing cloth, by means of rotatory cutters, traversing across the cloth from list to list, made upon the plan of Gardner and Herbert's patent, the same was alleged to be an imitation of the patent granted to the plaintiffs, and an infringment of their patent right. This being the same qnestion that had been tried before in the cause of Lewis *v.* Davis, (reported in the 2d vol. of our present Series, p. 258, which see for a full understanding of both machines, represented at plate IX.) Evidence for the plaintiffs produced the specification of their patent, and proved the working of machinery by the defendant, constructed upon a similar plan.

Counsel for the defendant took several legal objections to the claims set out in the plaintiff's specification. First, that the triangular wire coiled round the revolving cylinder, which formed one of the claims of the patent, was not now used, but a strip of metal with concave sides like the blade of a bayonet was found better, and employed in its stead. Secondly, that the brush, or strip of plush attached to the cutting cylinder, which formed another claim, for the purpose of raising the pile of the cloth as it approached the cutters, was not useful, and in fact had never been applied to any machine used by the plaintiffs. Thirdly, that the spring bed, claimed for keeping up the cloth against the cutters, was not new, as it was proved by two witnesses to have been previously described in the specification of Hart's patent in 1813; and fourthly, that the last claim of the plaintiffs' "the described method of shearing from list to list by a rotatory cutter," was a very different method to that employed by the defendant; or that if it was to be considered that the plaintiff intended by this claim to embrace every mode of *shearing from list to list* by *a rotatory cutter*, that his claim could not be maintained, as that invention was known before the date of their patent.

In support of this assertion it was proved in evidence, that the specification of a machine for shearing from list to list by a rotatory cutter, was sent from America about 20 years back, and a machine was made upon that plan in Yorkshire, but never set to work in consequence of the riots which at that time took place in the North. It was also proved that the model of a machine with a rotatory cutter for shearing from list to list, the same in principle with that of the plaintiffs', was brought from America eighteen years ago, and that it had been shewn to many persons without the charge of secrecy. This model was produced in Court by the gentleman who brought it. Lastly, it was given in evidence by a person named Jones, a cloth dresser, that he employed for some months, several machines of this kind having rotatory cutters shearing from list to list, in his factory at Bermondsey, nearly twenty years back.

The learned Judge thought the legal objections not worth entertaining, and left the Jury to find their verdict, which they did for the Plaintiffs,—Damages, £200.

On comparing the evidence in this cause, and the verdict which followed it, with all the precedents in our courts of law for the last fifty years, on the subject of contested patent rights, we think that no man with a particle of common sense will doubt the necessity of revising our laws relative to patents, or rather of enacting some certain principle which may be set down as law and not deviated from.

REPORT

Of the Select Committee of the House of Commons on the Laws of Patents.

(Continued from page 118.)

John Millington, Esquire, Professor of Mechanics in the Royal Institution of Great Britain, called in; and examined.

You are a civil engineer?—I am.

Have you heard what the last witness stated with respect to the inconvenience arising from the generality of the titles of patents?—Yes, I have.

Do you agree with him?—Yes, I do agree with him in many particulars. The reason, in general, of taking so wide a title is, for the very purpose of protection, that other parties may not hit upon the same thing.

Do you think, in the present state of the law, it would be a hardship upon inventors if they were compelled to give a more particular title?—I think it would be advantageous. Whenever a title does come before the Attorney General or the

Solicitor General, if it is at all vague, they will not permit it to pass.

How is it that so many vague titles pass?—Because there happens to be no objection made to them under caveat, or in any other way. I have acted for many years as agent in obtaining patents, as well as in drawing specifications, and in many instances I have known a title refused by the Attorney General, because it was too general. A short time ago Mr. Wollams applied for a patent for improvements in carriages; that was sent back again, because it did not state in what part of the carriage the improvement was to be.

If the inventor is obliged to state his invention very precisely in the title, is not he exposed to the chance of having the invention discovered before the sealing of the patent?—As the law now stands he is. I certainly think that it would be an advantage to the public, if security, in some way or other, could be obtained from the date of the first application.

Would you recommend, that the applicant for a patent should state very precisely what his invention was?—Perhaps not very precisely. I myself think that the French law of patents is very superior to ours, and there the process is to lodge the specification in the first instance, for which the heavy fees are paid; but then for a trifling fee of about thirty francs you may improve upon that which you have taken out in the first instance.

Is there any limitation of time within which that must be done?—No, provided it is within the term of the patent, which may be for five, or ten, or fifteen years.

That is done without obtaining any extension of the term?—Yes, it is merely an improvement upon the first patent.

Supposing a person makes a great improvement upon his original invention, might he take out a new patent for that, or must he, of necessity, add it to his old patent as an improvement?—He can take a new patent, as in England, for the improvement, but not for the whole thing.

So that he has the choice, either of adding his improvement to the old patent for the remainder of the term, or of going to the expense of a fresh patent for the improvement only?—Yes.

Are you acquainted with the law of patents in France?—Not very minutely; but having been employed to obtain French patents, I have their code of laws at home at length, as well as those of most other countries.

Does the specification undergo much examination before the commissioners in France?—It does not appear to me to undergo any; because I have known them inrolled with imperfections, and they pass them without any difficulty.

After a specification has passed that commission in France, are the public at liberty to question it in a court of law upon any doubtful point?—They are precisely as in England; there is this difference, that in France the infringement of a patent is penal, which it is not here. In England it is a mere question of damages, but in France it is penal to evade a patent, provided it is proved to be an evasion, and the infringed articles are burnt by the hangman.

What is the penalty?—Imprisonment or fine; every thing is seized; it is considered as trenching upon a government right; and as a contempt of the crown, rather than as a matter between the parties.

Supposing a patent is issued in France, and afterwards a small improvement is added to it by the same party, would it be good against a person making similar improvement at a subsequent time?—It would be good as to that improvement; but if an improvement was made which did not belong to the patentee, and he incorporated it with his original patent, and it afterwards did not appear to be his property, that would vitiate the whole patent.

Supposing a man takes out a patent in France, and afterwards adds a very extensive improvement to it, perhaps larger than the original invention, would it be protected?—It would; because it is then incorporated with the original invention.

So that the law of France goes to protect not only a little addition to the original patent, but a very extensive alteration of it?—Yes, it does.

Are you aware, whether or not the specifications are concealed in France from the public?—I should apprehend they are not, but I am not aware of that precisely.

Can you give the Committee any example of a patent in France which was originally taken out, and afterwards improved to a great extent?—No, I cannot; I have taken out many French patents; but I have not taken out an improvement upon any one that I have taken out.

The Committee have been informed, that in France a specification may, upon application to the Secretary of State, be concealed; are you aware that that is the fact?—I am not aware that it is. In England I believe they can only be concealed by application to Parliament, because there have been concealed specifications in England.

Are you aware, whether there is any office in France where you can go and inquire whether such and such a patent exists upon any particular subject?—I fancy there is, because I have made inquiries of my agent in France, and he has furnished me with the information; but whether he got it officially or by favour, I cannot say. With respect to the means of finding what has been patented before in this country, I apprehend that Mr. Clegg, the last witness, must have been under some misapprehension as to that; because there is no classed list of patents. They are merely inrolled by the name of the party, and there is not even an index of the inventions; but Mr. Poole, who is the deputy in the Patent Office, for his own amusement, and for the inspection of his employers and clients, has all the patents arranged in that form; but then that is not officially done, and it is of course liable to error.

Suppose a person is engaged in an invention, would not it be very desirable for him sometimes to be able to gain access to all the specifications upon that subject?—Certainly it would.

And in order to do that, it would be necessary to have some index?—I have, in my own instance on two occasions, had to make out lists at very great labor; I made one lately for Captain Ross, which he added to his account of Steam Navigation; he has got a list of all the patents that have been taken out for steam engines; I obtained for another party a list of all the patents for fire-places; but it is a thing of great labor, and it is very expensive; because there is not only the office-fee to be paid for the search, but it requires a person to give great attention in looking through the books.

Unless a person who is engaged in an invention has an opportunity of looking at all the previous specifications, is he not liable to take out a patent for something that has previously been patented?—I should say that nine-tenths of the patents which are taken out, are not for things that have been patented before, but for things that existed before. That arises from a want of knowledge in the parties; and that is perhaps one of the mischiefs that attend the sort of secrecy there is in taking out a patent, that many persons fancy they have made an invention, and when they bring it before the world, it appears to be a thing that existed before.

Do you conceive that it would be a great advantage to have a list of patents published?—I think a list arranged according to the inventions would be more essential than the list of names which is kept at the offices, because now the only thing that is kept is a list of the names of the patentees.

Will you inform the Committee how you obtained this list of the patents, which you say you got for Captain Ross?—By going to the office and looking over the book, taking every patent as it occurred through a number of years, at a very considerable trouble.

Which office did you go to?—To the Inrolment Office in Chancery Lane, to the Petty Bag Office, and to the Rolls

Chapel Office; and it is a great inconvenience that they are divided among three offices; because, if I want to find out the specification of a patent, which was taken out by A. B. on a particular day in a particular year, I may have to go to all the three offices before I find it.

Is it optional on the part of the patentee which of the offices he shall inrol at?—It is quite optional.

What is the description of list or book that is kept at each of those offices?—At the Inrolment Office there is no particular book kept for patents for inventions; because memorials and a variety of deeds have to be entered at the same office, and they are all entered in common in the order in which they come in. The only facility that they give is, that they write the word Specification in rather larger letters; so that if you are looking for a patent, you jump from one specification to another.

Is there any index to the book?—There is an index, if you know the name of the inventor and the date; but the index is not always made up to the time of the search.

Is the practice the same at the other offices, or different?—It is nearly the same.

At the Petty Bag Office is not there a book simply for patents?—They have some other records there; but they have a book expressly for patents, which Mr. Abbott keeps; but I think that is not official.

What is entered in the book?—The name of the party, the date of the inrolment, and the title taken from the patent, whatever it may be, in one line or more, as the case may occur.

Would not it be very desirable to have a complete list made out of all the patents?—I think it would.

In making that search for Captain Ross, would not it have been a great convenience if you had had the list to which you have referred?—He had to pay me for doing it, and in that case he would have had nothing to do but to get the list; there is nothing to pay but a shilling for the search, and half-a-crown for reading a specification. You are not at any of those offices permitted to copy a single word: you may take as much as you can away in your head, and it is chiefly in that way that the statement is procured, which is inserted in the periodical publications; but if you wish to have an office copy, you must have it upon stamped paper, at I think six and eight-pence a folio; and I have had as much as fourteen or sixteen pounds to pay for an office copy, and I never knew any one under two guineas. A part of this expense arises from copying the drawings.

Is it not likely that the statement given in the periodical publications is very often incorrect?—It is very frequently incorrect.

What is the fee for a search for a specification?—At the Inrolment Office it is one shilling for the first year, and four pence for every year; at the other offices it is a shilling for any length of time you like to search, and half-a-crown at the whole of them for reading a specification; you pay half-a-crown for each specification you read over.

Then the search is not very expensive?—It is only expensive inasmuch an it wastes time, and if you are unacquainted with the name of the patentee and the date of the patent.

Is it the same with regard to searching for any other papers there?—Just the same; it applies to deeds and registers, because the same books contain many other things besides patents for inventions; there are offices, titles, appointments, and other things held by letters patent, and they are all inrolled together.

Have you any other observations to make with regard to the laws relating to patents?—It has always appeared to me that the great inconvenience attending obtaining patents, was the necessity of preserving secrecy during the period of two, four, or six months; and that you are likewise under the necessity if you wish for a period of six months for inrolling your specification, of making an affidavit, that the consciences of some people do not exactly like, inasmuch as they have to swear that they have an intention of obtaining a patent for Ireland and Scotland, when perhaps they have no such intention, but they cannot get the six months without doing that.

Do you think that two months is too short a time?—That depends upon the nature of the invention.

Suppose a party shows reason to the Attorney-General for an extension, does he not usually obtain an extension of the term?—Yes. Another great inconvenience is, the parties being obliged to attend personally to acknowledge their specification; it cannot be done at present by a power of attorney, or in any other way.

Cannot it be done by persons residing in the country, by going before a master extraordinary?—Yes; but an instance occurred to me with regard to Mr. Collier, who had to go to the continent, and he only arrived in town a few hours before the time allowed for finishing his specification, otherwise his patent would have been lost.

Do you agree with what the last witness stated, that it would be very desirable that the applicant for a patent should be secure from the period of his first application?—I do.

Do you see any way in which the protection of patents afterwards could be improved, so as to give greater security than the law affords?—I do not see any way.

What is your opinion of the appointment of a commission for the decision of all questions relating to patents?—That was a favourite notion of mine some years ago. I thought that commissioners might be appointed from among the most eminent men in the country, in different branches; taking one set of men for chemistry, and another for mechanics, and another for agriculture, and so on; instead of going through the present almost non-efficient process of petitioning the King through the Secretary of State, and then the King referring it to the Attorney-General to report whether the patent is worthy to be passed, and his signing a warrant or certificate again, to say that it is worthy to be passed, I thought it ought to be referred to commissioners, and that those commissioners might be paid nearly in the manner of commissioners of bankrupts, no very large fee, but still enough to make the business worth their attention, and that they should declare whether the patent is fit to be passed or not. This would increase the expense of the patent; but it occurred to me that the stamp duty might be diminished, and that a greater revenue might be produced by a stamp duty on the articles sold, instead of upon the original patent; because as the matter now stands, whether a man does not make a penny by his patent, or whether he makes an immense fortune, the country gets no advantage; but, on the contrary, if any thing of an *ad valorem* duty could be devised, so that that man who made nothing by his patent, should merely have the expense of his patent, and he who made a large fortune by it, should contribute a portion of that fortune to the state, it might be advantageous; but there seems to be a great doubt as to the possibility of obtaining commissioners, or of getting the duty performed in an efficient manner without partiality or prejudice.

With reference to the security of a patent after it is granted and specified, if there is great technicality connected with it, could not such a commission better decide whether there was an infringement upon it than a jury could do?—Most certainly.

Would it not be necessary to subject the evidence given before such commission to the same provisions of law, in case of false evidence being given, which apply to evidence given before a court of justice?—Certainly.

It has been stated, that a jury is very often a very incompetent tribunal to try patent rights, do you concur in that opinion?—I do, from very long experience.

Would you prefer a commission of persons who understood the nature of the invention?—I would.

From the incompetency of a jury, are not parties often put to great expense, in order to explain the nature of their invention?

—No doubt they are; because it is customary in all patent trials that are of importance, to subpœna almost all the engineers in town, who attend at very considerable expense to the parties; and if the commissioners understood the thing, of course it would not require that explanation.

So that, supposing that tribunal were subjected to all the rules of the courts of law with regard to the truth of evidence, such a commission without a jury would be better than the present mode of trial before a judge and a jury?—I conceive it would be more advantageous to the patentee; he would have a greater chance of losing his patent if it did not deserve to stand, and a greater chance of maintaining it if it did.

In fact a dishonest man at present has a greater chance than he would under those circumstances?—Yes, and I think if the patent passed for the three kingdoms, instead of separately, it would be advantageous.

Do you think that the expense of a patent is any evil?—I do not think it is, provided the patent was a secure property; I think it is rather an advantage that a patent should not be too cheap; the world would be inundated with them if that were the case.

Do you think that every patent should be for all the three kingdoms at that expense?—No; but I think if a party chooses to pay more, and obtain a patent for the three kingdoms in the same manner as he now does for the Colonies, in which case I think it is six guineas or six pounds, without having to send to the East or West Indies, and I think as the King's prerogative extends over the three kingdoms, if the party were allowed to have a patent for the entire dominion, upon paying a less sum than that which is paid for the three kingdoms at present, it would be of great advantage.

Provided the law remains as at present, of the three kingdoms being distinct, do you think it would be of an advantage, that whether the patentee went for one, or whether he went for the three kingdoms, he should have six months for putting in his specification?—Inasmuch as if you have six months, you can specify on the following day if you think proper; I think it might be an advantage; but, on the other hand, it might delay other inventors, because that is the only inconvenience that attends the extensions of time for specifications.

As persons sometimes are induced to state what is not quite true, for the sake of obtaining an extension of time, would it not be an advantage if the same time were given in each case?—I think it would.

Have you been much engaged in drawing specifications?—Yes, I have.

Do you conceive that from the uncertainty of the law at present, there is much difficulty in some cases in drawing specifications?—I conceive that there are but two difficulties attending the specification; the one is, not to describe that which is the property of the public before, and which requires a very general knowledge of what has existed; and the second is, to describe the thing so clearly, that every competent workman will be able to carry it into effect.

Are not there some cases in which hardly any skill on the part of the person who is employed, will enable him to draw a specification that will secure the patent?—No, I should almost say not, with the exception of the first point I have mentioned, which perhaps no human being can be supposed to possess, that is, a knowledge of every thing that has gone before.

From a review of the cases, with regard to patents, is it not manifest that the Judges have very materially differed in their opinions as to the construction of the law?—Certainly they have.

Taking that into consideration, how is it possible to draw a specification which you are quite sure will meet all possible objections?—It may not meet legal objections, because there is certainly some doubt as to the mode of defining what a principle really is, because it is held that a principle is not patentable.

Are there not many cases in which the Bench has differed as to the sufficiency of the specification. There are, certainly; it depends, in some measure, upon the nature of the invention; because there are some inventions which it is almost impossible to divest from being principles.

Are there not many cases in which the patentee receives a sum of money from other parties for giving them a licence to use the patent?—In many cases.

Have you ever known an instance in which a person who has held himself out as ready to license persons for the use of that patent, has refused to license individuals?—I have never heard an instance of the kind.

Do you consider that he is under any obligation to license all that apply, upon agreeing to his terms?—No, I do not conceive that he is; but I never knew an instance of a refusal.

Have you ever known persons who have obtained licences for the use of a patent, to stipulate that the right of using the patent should not be granted to others?—Never. There is another difficulty which I have on the tapis at the present moment. As the law stands at present, it does not appear that there is any protection of patent property in the East India possessions; they do not appear to be included in the colonies; and I think ought to be included in the laws of the country. An employer of mine has made an important invention, which happened to be particularly useful in the East Indies; he has been offered a large sum of money for the use of it: he applied to me to take the opinion of counsel, as to whether the patent which he has for this invention for England and the colonies, extended to the East Indies; and the answer given by Mr. Serjeant Spankie was, that it did not extend to the East Indies, inasmuch as the East Indies were not colonies. I then applied to Sir James Scarlett, who was then Attorney General at the time, to ask, whether he would grant a new patent for the same thing, inserting the word "dominions," or something which Mr. Serjeant Spankie had represented as the right word, in the patent; but he said he could not do it for want of precedent; and I then applied to the East India Directors, to know what their feeling on the subject was, and again laid the matter before Mr. Serjeant Spankie, who seemed to think, that if the patent was granted for England and the colonies, that it would cover India, provided it was recognized by the East India Directors; and the difficulty at present is, how it is to be recognized, which is, at present, about to be laid before Mr. Serjeant Bosanquet, the standing counsel of the East India Company. It was proposed to be done by an office copy made here, and transmitted to their presidencies, because the invention is of so much importance that the expense is no object, and the party is very desirous of being protected in India as well as in England. It does not appear that any one before this gentleman has ever applied for a patent for India.

It has been stated, that a patent taken out for the colonies, does not avail a party in those colonies that have legislatures of their own, unless it is recognized by those legislatures; does much inconvenience arise from that?—I never yet heard of a patent producing a sixpence in any of the colonies.

Are they often taken out for the colonies?—Very frequently. There is another inconvenience which sometimes occurs practically with regard to trials in court, which is, that the patentee prepares a specification in the nature of a deed on parchment that goes to the Inrolment Office, and is copied on to the long rolls; but the patentee himself has no opportunity of examining those rolls with his original specification; and although I have done it in many cases of importance, yet it is a matter of indulgence. Now it is the that roll alone be brought forward as evidence in a court of justice; you cannot bring the original specification; and although they are copied as carefully as possible, still, as they are done by mere copying clerks, and perhaps the original is not very clear, I have in some instances seen rolls and office copies brought forward, which are quite unintelligible from mis-placed or mis-spelt words, from the parties copying them not understanding technical phrases; and I think the patentee should be compelled, or at least ought to have the privilege of examining the roll after it has been copied.

Has there been any instance of a patent being set aside in consequence of such an error in the roll?—No, it has produced difficulty sometimes.

In case of such a thing having happened on a trial in a court of justice, has the court ever allowed the original specification to be brought?—Applications have been made to produce the original specification; but inasmuch as that it is in the hands of the patentee, and of course subject to alteration, I have known it refused in court; because the patentee may have altered it while it was in his possession. I should wish to mention also, that there is a great delay in obtaining an Irish patent in almost all instances, which is very mischievous.

Mr. Samuel Clegg, called in; and examined.

CAN you state whether there are any inconveniences attending the present state of the laws relating to patents?—There are inconveniences attending the present law; one great inconvenience, I think, arises where a person takes out a patent, not specifying at the time sufficiently explicitly what the patent is for, so that it keeps another person who may have invented something similar, completely out of the market till he lodges his specification; and perhaps just previously to his lodging the specification, some other person may take out a patent for a similar thing: for instance, upon the occasion of the last patent I took out for certain improvements in the construction of a steam engine, I had to wait six months, because a person had just previously taken out a patent for certain improvements in the steam engine, and I could not tell what those certain improvements were.

Would a general title of that sort preclude other persons from taking out a patent for any thing of the same sort?—Yes; at least it would not be safe to take out a patent till you knew what the other person had taken out his patent for.

In that case how long would you have to wait?—Till he puts in his specification; there is one person who has taken out a patent, who did not put in his specification for fifteen months.

Then during that time all patents for improvements on steam engines are in a certain sense precluded?—Yes.

Could not you, by communicating your plan to the Attorney General, ascertain whether it was the same or not?—I should not think it safe to do that; I should not like to communicate my plan to the Attorney General; if a person who is in the possession of the patent should by any means get hold of my idea, and find it better than his own, he is quite at liberty to lodge mine instead of his own.

Do you mean that, in point of fact, such a description made by a person who obtained fifteen months for putting in his specification, would prevent any other person from taking out a patent for any further improvement in the steam engine for fifteen months, unless he went to the Attorney General?—Yes; perhaps persons who do not understand the objects of the patent law, will lodge a specification before they make inquiries; but that is very impolitic.

Suppose you apply for a patent for an improvement in the steam engine, and another person, before you had inrolled your specification, applies for a patent also for an improvement in the steam engine, what would be the result; would the Attorney General refuse to grant that second patent?—No.

Might two persons at the same time be taking out patents for improvements in the steam engine?—Yes; the only consequence would be, that if the person who got the first patent had a longer time for lodging his specification than the second applicant, he might take advantage of the specification which the other had lodged.

Supposing the second applicant for a patent did not lodge his specification till after the first applicant had lodged his, would any inconvenience result to either party?—The second applicant would run the risk and expense of his patent for nothing. Supposing the first applicant has not lodged his specification, and the second one takes out a patent for the same thing without knowing it, he will be throwing his money away.

Would you think it desirable to oblige persons to entitle their patents in a more particular and detailed manner?—Certainly.

Can you give an example how the person that prevented you from taking out your patent ought fairly to have entitled his?—If he had stated that it was a patent for a rotative piston, then I should have proceeded with my patent, because mine was not a patent for a rotative piston. If a person mentions what the construction, or what the part is, then it does not interfere with other patents.

Is not the reason that people give their titles so vaguely, on purpose to remedy that evil of which you just now complained; namely, that the second person shall not discover what the first is doing, until the first has an opportunity himself of specifying it?—A person coming afterwards could not avail himself of it, because his patent would be of a subsequent date.

Then what is the reason, in your opinion, that people express themselves so vaguely in their title?—To give them a large field of speculation. I have known people to take out a patent for improvements; not having defined exactly what those improvements should be, they have got an idea which is not at all distinct, and during the time allowed for specifying, if they can meet with any thing better than their own ideas, they will lodge it frequently. When they know that a person is engaged with some improvements in the steam engine, they will often take out a patent for improvements in the steam engine, under the notion of getting hold of this person's idea.

Supposing you had conceived an improvement in a certain part of the steam engine, and a person had lodged a caveat, and you went for your patent, and stated the particular portion of the steam engine upon which you were so going to make an improvement, should you not be afraid, with the ingenuity that you know there is in every part of the world, that some person might be induced to pursue the very same improvement that you yourself were doing, if he knew what the point was at which you were aiming?—If there were two applying at the same time, I should not specify what particular point mine was.

You say, the other patent was entitled, "For general Improvements in the Steam Engine;" and, in point of fact, it was for a rotative piston; what was your's?—Mine was a semi-rotative.

Were you prevented from proceeding immediately to take out your patent, in consequence of the largeness of the former title?—I was.

Did you proceed afterwards to take out that patent?—Yes, when the other was specified.

Then, in point of fact, you had a patent for your invention, which you were unable to pursue until the expiration of those fifteen months?—Yes.

Do you know any other similar case?—That has occurred to me twice; the other case was about 1806; I took out a patent for a rotative piston, it was called, "For Improvements in the Steam Engine," and I was hindered, at that time, from taking out the patent by some other titles of patents that were running.

Do you know what those other titles were?—It was for certain improvements in the construction of the engine.

Did that delay you in taking out your patent?—Yes, and I have known a great many other people make the same complaint; particularly in the case of patents for cotton machinery, for certain improvements in lace manufacture, and other machines of that kind.

Do you know other instances of the same kind?—No, I am not prepared at this moment with any other; but I know that there have been such instances; and I know that people are suffering inconvenience now from a person having fifteen months to specify under a vague title.

Do you consider that, in the present state of the law, there would be any inconvenience to inventors, if they were obliged to make the titles of their patents more distinct?—No, I do not think there would; I think it would be better.

You are aware that there is no protection to the inventor between the application for the patent and the sealing of it?—I am.

During the time, do you think that a more precise title would expose him to a risk?—No, I do not think it would; for instance, if I had a peculiar plan of making a metallic piston, that should serve without packing, I could safely say, that I would take out a patent for an improvement in the piston, and whoever contrived any improvement in the piston, of course would not specify that particular part till mine was specified.

Would you have no apprehension, that when the attention of ingenious persons was turned to the subject you were engaged in they might anticipate you?—Not at all.

Would you think it an improvement in the law, if the inventor was made secure from the moment he applied for his patent?—Certainly.

In that case there could be no possible objection to requiring that he should give a very precise title to his patent?—None at all: the short time allowed for specifying is another great inconvenience; and if the first evil I have mentioned was remedied, by his being more specific in the title, there might be a longer time given to specify; for when you come to put the thing into practice, however perfect it may be in theory, it generally alters its features so completely, though perhaps precisely on the same principle, that it does not correspond with the original drawings lodged. A man can very seldom get a machine constructed in six months. Although my last patent has been specified nine or ten months, I have not had time to complete one machine.

You think if the title were made more particular, there would be no objection to giving a longer time to put in the specification?—Not the least.

Are there any other points upon which you have any suggestions to make?—I think, in many cases, the period of fourteen years is too short. For expensive machines or engines, such as steam engines, or complicated machinery in cotton-spinning or lace manufacture, and other things of that kind, I should think there ought to be a longer time granted, on the payment of a certain sum of money: perhaps five or six years may elapse before a person can get it into the market; and by the time he gets it into work, so as to be profitable, the time has nearly expired.

You are aware that patents are sometimes extended by Act of Parliament?—Yes, but very seldom; and it is difficult to obtain. The last but one that I had, I tried to get extended this session, but I could not do it.

Are there many patents in respect of which it would be just to extend the time beyond fourteen years?—I think so.

Do you mean to say, that there are many inventions that require more than fourteen years to make them profitable to the inventor?—Yes; I think there are some inventions that require that time to perfect the machine before it is turned out into the market.

Can you mention any instance of that sort?—Yes; my patent was for a gas-meter, which I invented about fourteen years ago, and I think ten years of the patent nearly expired, in which I expended some thousands of pounds, and scarcely got one into the market, and it is now getting generally used; and if the time could have been extended, it would have remunerated me for the expense, and I should have made a profit of it, but as it is, it is a loss to me.

You think there should be a power vested in some quarter or other to extend the duration of patents?—Yes, upon a proper application; saying that such a sum of money has been expended: and that the time that it has to run will not be sufficient to remunerate the expenses, and to make a profit.

Have you ever considered where that power could be lodged satisfactorily?—No.

To what do you attribute that delay in introducing it to general use?—When there is any thing new of that kind, where there has been nothing of the kind used before, prejudices and various causes arise to prevent its general introduction; one great question that is asked is, how long will it last, and it is only the lapse of a certain time that will answer that question satisfactorily.

What is the objection to the present mode of extending a patent by Act of Parliament; is it to the expense that you are subject to, or the difficulty of obtaining it?—To the difficulty besides the expense of it. The extension of my patent was opposed by almost all the gas companies throughout the country; they thought they could get the thing cheaper if the patent was not renewed; and so, after a number of years, and the expenditure of a great deal of money in perfecting the machine, it is thrown open to the public without any remuneration to myself.

Can you state any other instances of patents for useful inventions by which the inventor has not been adequately remunerated within fourteen years?—There are many; there is Mr. Perkins's, for instance; he has been the whole fourteen years making experiments with his contrivance of high pressure steam, and he has not brought it into the market yet.

Do you think it would be a convenience if persons were allowed to take out patents for short periods at a proportionably small expense?—Yes.

Do you conceive that the expense of taking out a patent now is any evil?—No, I think it would be better if it were more,

Have you ever had to defend one of your patents?—Yes.

Did yon find much difficulty in maintaining that patent?—No there was not much difficulty; the cause was tried in January last in the Court of King's Bench; it was for a gas-meter; there had been various infringements upon it, altering it in form, but completely adopting the original principle.

Is there much difficulty in preparing such a specification as will support a patent?—Not when it is a new principle; but if it is merely an alteration, or an improvement of the original patent, it is very difficult to specify so as to maintain the patent; it is scarcely safe for any person to take out a patent unless it is a new principle; it is very difficult to maintain a patent merely for a slight alteration of form; another alteration might perhaps produce the same effect, where there is no new principle.

Are not the greater number of patents for improvements?—The greater number are for alterations; in some cases merely altering to the eye.

Does not any alteration of machinery afford a subject for a patent?—If it produces much simplicity, or answers the same end with only a portion of the expense; but in all things of that kind it is easily specified; I am speaking now of cases of slight alteration.

Where the objects are slight alterations are they worthy of a patent?—No, I do not think they are; I think patents ought to be confined almost to cases where the principle can be clearly stated; two-thirds of the patents are for mere alterations which nobody would ever look at the specification of.

Are you aware of many patents being set aside on account of some defect in the specification?—Yes, there was one set aside some years ago at Chester, it was merely a mistake in the drawing; the draftsman had drawn the lever that worked a part of the machine to go through the wheel, and the wheel could not revolve with it; that was in a power loom.

Are not the greater number of defects in the specification defects as to the wording?—Yes.

Do you conceive that many specifications are purposely drawn defectively with the view of misleading the public?—I believe there are some drawn in that way, but I am not acquainted with any instances of that kind ; I believe there are many specifications entered totally different from what the real thing is for which the patent was taken out.

Do you think the present tribunal, by which a patent is tried, is a satisfactory one ?—I think patent property is very uncertain property at present.

What does that insecurity proceed from ? Is it from the uncertainty of the law, the varying decisions of the Judges, or is it from the incompetency of a jury to decide upon such questions ?—I think it is from the uncertainty of the laws. The expense of a trial is very great ; and till it is tried once or twice, or perhaps three times, it is not sufficiently established to deter other people from infringing upon it, if it is any thing of moment.

Are you aware that the Judges differ very often in the construction of the law ?—Yes, I think the present Lord Chief Justice is very favourable to the law of patents ; and I think a patent is much more secure while he presides, than it was with his predecessors.

What reason have you for prefering the present Chief Justice to the former one ?—He considers patent property more sacred, and that a slight alteration or a little technical difference should not set aside the patent.

On what grounds do you think the present charge for patents not too high ?—If it is any thing worth taking a patent out for, I think the expense is no consideration, because half a year's profit would pay the expense of a patent.

If the price of patents was very much reduced, do you think that patents would be taken out for very minute details ?—I think in that case the Patent Office would be so loaded that a person could hardly bend an iron in a particular shape without running the risk of infringing a patent.

Do not you think that the multiplication of patents to a great extent, would be a great impediment to improvements in machinery and in arts ?—Yes.

Have you known any instances of patents for small things which have stood in the way of improvements in machinery ?—I cannot call any to mind at present.

Are not workmen, and people of that description, constantly in the habit of making little observations and small improvements ?—Yes ; sometimes very important ones arise from the workmen. If a workman has discovered any thing of the kind, and finds it likely to be beneficial, there is no difficulty in procuring any one to join him in the expense of taking out a patent for it.

Do not you think that if it became a habit among that class of people to secure patent rights for those small discoveries at low rates, it would be very inconvenient?—I think very much so.

It has been stated, that the expense of taking out a patent for England, Scotland and Ireland is something between 300*l.* and 400*l.*; do you mean to apply your observation when you say, you think the expense is not too great to that rate of expense?—Yes,

You mean to say, that that is not too great an expense for a patent for the three kingdoms?—No; I should think it would be no worse if it was a little more; it bears no proportion to the expense of completing a machine, or of defending it when it is infringed.

Have you ever considered whether it would be convenient to inventors, if they were allowed to have their specifications sealed, and concealed from the public?—No, I think it would be an inconvenience; I think it would not be a proper thing towards those engaged in the same line; there may be things sealed that other persons may be pursuing with vigour and expense; I think after it is once secured, the more public it is made the better.

Supposing a person at Birmingham or Manchester is prosecuting an invention, what means has he of knowing whether any patent has been taken out upon the same subject?—By applying at the Patent Office for a list of the patents upon the same subject.

Do you conceive it would be any convenience if there were offices established in the different manufacturing districts in which copies of the specifications were lodged, so as to be accessible to the public?—It would be very useful, and it would be a great advantage if a specification could be got hold of with greater facility than it is in town: they are not sufficiently clearly registered to know what are taken out; some things are omitted.

Would a person wishing to inspect a specification which has been inrolled some years ago, be put to considerable expense?—Yes.

How would that expense arise?—Perhaps from being obliged to come up to town.

Supposing a party wants to know what patents have been taken out for improvements made in the steam engine in the last ten years, is there any index or list?—He must go to the Inrollment Office, and he must pay so much for every copy he looks at; if he knows the date of the patent, he will find it there by paying a shilling.

Is there any list kept of the patents, by which a person wishing to obtain the information alluded to could obtain it? —No, I do not know that there is any list that a person could look over; if he is not certain of the date, I think he would have great difficulty in finding the patent he is in search of.

Supposing a person engaged in an improvement on the steam engine wishes to see all the specifications that have been inrolled within the last ten years for improvements in the steam engine, how would he set about it?—He must go to the Inrolment Office, and ask for the specifications of steam engines for as many years as he pleases.

What would he pay for that?—He would have to pay a shilling for each.

Do you mean that the clerk at the Inrolment Office would at once put them into his hands without further search?—Yes.

Is there a list kept?—The clerk keeps a list, and you ask for a patent of any date.

Are the patents upon different subjects classed?—Yes.*

So that the public have in fact the means of obtaining that information?—Yes, those that live in London; but if a person living in the country wanted to know that, he would perhaps have difficulty in getting the information through his agent; he would very likely want to see what had been done in that line, and he could not get that information without a copy of the specification; and each specification would be attended with considerable expense; I believe copies of the specifications average about half a guinea, without the drawings†.

Are there not lists of the specifications published in the different periodical works?—Yes; but they are not to be depended upon.

Do you conceive that there are many inventions lost to the public from persons being unwilling to take out patents for them owing to the uncertainty of the law?—I think there is no doubt about that.

Do you think there are many of importance lost?—I can scarcely say about that; they might have been of importance, if they had been pursued.

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* That is a mistake; the Clerks of the Inrolment Offices know nothing about the inventions, and are only enabled to hand a specification to an applicant on his stating the name of the inventor, and the date of the grant. Our Journal contains a description of EVERY PATENT and is the *only* source of obtaining that information to which the public have access.—*Editor.*

† No partial copies are allowed to be taken; the whole specification (with a stamp on each sheet), and all its drawings can only be obtained, and the average cost may be stated at from two guineas to ten, and sometimes as much as thirty or forty guineas, if the description is long and there are elaborate drawings.—*Editor.*

Are you aware of the French law on that subject?—Yes, I have taken out many French patents.

Is it not the case in France, when the petition is presented, the applicant for the patent obtains a certificate, and from the moment he obtains that certificate he is safe from having his invention pirated?—He is safe, (it is supposed he is safe;) but another person may improve on his invention.

He has all the protection a patent would ever grant him?—Yes, if new, from the very moment of lodging his specification.

He is as safe from the moment he applies as he ever can be made?—Yes, precisely so.

Do you see any objection to introducing such a regulation in this country?—I do not; to the security commencing from the time of application.

Do you see any objection to the adoption of some arrangement by which a person applying for a patent should be secured from the moment of his application?—I see none.

What is the usual time that is given for enrolling a specification after the patent is claimed?—Sometimes two months; but six for England, if Ireland and Scotland are intended; Scotland alone has four.

Do you conceive there would be much difficulty in drawing a specification so as to secure the patent in a court of law?—I do, and I think there are few persons capable of it.

Can you at all point out to the Committee in what that difficulty consists?—In their describing what has been used before, that is one fatal ground; and not so fully describing and claiming that a workman could work from the description, are the two principal points.

Are not those objections easily obviated by accuracy in the description?—There are few persons who are capable of describing the invention, they not being acquainted with what has been done before.

May not a person, with due diligence, ascertain what has been done before?—It is a very difficult thing.

Is it true then, that in point of fact, the greater number of patents are set aside from some imperfection in the description?—I think it is very often in consequence of the title not agreeing with the specification, as well as want of novelty and other causes.

Can you give the Committee any information on that point to illustrate that?—The title must cover the invention which they intend to take the patent out for; for example, suppose "certain improvements in a machine," was the title, and supposing it but to be only one improvement, that would be a ground of making the patent void, or the contrary; for what can a patent be granted ; the law is very confined in that respect, it must be for a new manufacture.

Do the different Judges, who have decided on what is and what is not a manufacture agree ?—I do not think they have clearly defined it ; but I am not prepared to state in what cases they have not.

Have you yourself been in the habit of drawing up specifications ?—Never ; it is too difficult a thing for me to undertake ; I occasionally look them over.

There are a particular class of persons ?—Those I have been in the habit of recommending are, Mr. Farey and professor Millington, Mr. Rotch and Mr. Gill and others. Some persons undertake them who have no ability for them, and many capable, decline drawing them.

Do you conceive those persons the best qualified to prepare specifications who are able to do so with certainty, that it shall be sufficient to support a patent in a court of law ?—I do, but there is difficulty.

That is owing to the uncertainty of what is and what is not the law ?—Yes.

Have you considered whether it would be desirable to have a commission who should examine the specification before it is inrolled, to ascertain whether it is a sufficient description of the invention ?—It might be desirable to look into the specifications in that way.

Have you considered how such a commission could be formed; of whom it should consist ?—I think of persons accustomed to the work ; such as engineers, mechanics, and committees according to the invention, it should have suitable persons for each sort of patent.

Should you think it fair that it should be a permanent commission or a varying one, or one appointed for the time ?—Perhaps a number for each invention ; for mechanical and other purposes, a continued commission.

You would allow their decisions to be final, as to the sufficiency of the description, or let it still be open in a court of law ? —A desirable thing to attain would be to make it final ; to give the patentee security from their decision if it could possibly be obtained.

You conceive then that their decision would be satisfactory to the public ?—I do not know, I am sure, about that ; scientific men vary in opinion on some cases.

Would you see any objection to such a commission ?—Not for the specification after the patent is secured.

Do you see any objection to a commission, constituted in the way you mention, being authorized to decide finally on the sufficiency of such description ?—None.

Can you give the Committee any information with respect to caveats?—Yes; it acts merely as a notice when entered, and on an application being made for a similar object; the party hears of it, and decides within seven days if he will oppose the invention being granted or not.

Do you conceive that gives any protection to the inventor? —It gives him half the invention if they are alike; if a caveat is entered and a person applies for a patent, if on examination they prove to be the same.

Have you ever had to prosecute a caveat before the Attorney General?—Nearly every week. I had two last Saturday; and I have appointments this week.

Does the Attorney General ever call in the assistance of a scientific person to assist him in his judgment?—I never knew it done,

Suppose the Attorney General is not himself acquainted with mechanics or chemistry, what means has he of deciding between the claim of the two?—They are generally very minute in the examination when they find any difficulty; they see the party, time after time until they are quite acquainted with it. Sometimes they go in three or four times; sometimes they take a month to consider of it. I have one now which has been standing over three months.

During the time that the question is considering before the Attorney General, is the applicant for the patent secure?—No.

During all that time he is exposed to have his invention published?—Yes.

It is the practice, is it not, for many parties who have patents still to maintain a caveat?—I recommend them for all the fourteen years.

For what purpose?—To prevent others from taking the patent for the same object. If a person applies for a patent, the patentee has the option of sending the party applying to the Inrolment Office, where the specification is lodged, and desiring him to read over his specification.

Do you conceive there is any advantage in separating the grants of the patent for England, Scotland and Ireland?—If a patent were to include the United Kingdom, I think there would be a great disadvantage to those inventors who are obliged to commit the making of models or drawings to others, as instances have occurred where the workman has either himself pirated the invention, or inadvertently or designedly made it known to others, in which case the only remedy open to the inventor is to make the best of his invention in the other two kingdoms, he having lost all his chance in the one where it has become published, prior to his having taken his patent.

Do you conceive there is any inconvenience, as to cost, in taking out the patent at present?—I do not think it is too dear.

What is the whole expense?—About 360*l.* the three kingdoms, if with a short specification, and no opposition.

What advantage do you conceive is derived to the public in making the price of the patent so high?—It prevents patents being taken out for too trifling objects.

What inconvenience do you think would result, if patents were to become more numerous, and they were to be taken out for trifling inventions?—It would be, I think, to the injury of the common tradesman. A patent is an exclusive right to the vending of a certain article, and of course the patentee has a privilege over the rest in the same trade; if he gets that privilege too cheap, it would be to the injury of other tradesmen in the same line.

If he makes a useful discovery, why should not he derive the benefit from it?—The privilege is so great, when the thing is worth any thing at all, he ought to pay for it.

Do you think where an invention was of trifling importance, it might be desirable to allow a person to take out a patent for a shorter period, say for five years?—I should say not; I have heard no objection to the term of fourteen years by any person.

Are there not many trifling inventions for which the term of fourteen years is too long?—I should think not.

Are you aware of the patent that was taken out for the kaleidescope?—I am; that was lost, not in consequence of time, but in consequence of exposing it before the patent was sealed.

Would a patent for fourteen years for an invention of that sort be desirable?—I should see no objection to it.

Might not the inventor of it see an objection to taking out a patent for so long a period at the present expense; would not it have been much more convenient for the inventor to take out a patent for five years, at a less expense?—I think it might be so; but I think that most persons would rather pay a larger sum and have it for fourteen years, than pay a smaller sum and have it for five years.

If your objection to diminishing the expense is that it would make the benefit derived from the patent more than commensurate to the expense of it, would not it in some degree be met by diminishing the advantage derived from it, which would be done by shortening the period for which the patent would last? It might be.

What office do you hold in connection with patents?—I am a clerk in the Patent Office by the appointment of the Attorney General.

Is that appointment a permanent one ?—It is considered so; I have a written appointment from the Attorney General; Sir Samuel Shepherd gave it me when my father died, who was in the office for thirty-six years before that period,

Are the specifications inrolled in that office ?—They are not; there is the Inrolment Office, and the Rolls Chapel, and the Petty Bag Office for inrolling them.

What are the duties of the Patent Office ?—The Attorney General receives the King's warrant, and prepares the bill for the patent, prepares the transcripts, and sends them on to the Signet Office and Privy Seal Office.

Have you the custody of any of the deeds ?—Mr. Dealtry, who is clerk of the patents, keeps all the warrants for the Attorney General.

You are aware that the original specification is returned to the party after it has been copied and inrolled ?—I am.

Can that original specification be made evidence in a court of law ?—I apprehend not, for this reason, we have the specification out, and should there be any defect in it, the party might alter it, and say it was the correct state of it at first.

Do you see any objection to allowing the original specification to be made good evidence in a court of law, on proof that it had been verified with the inrolled specification ?—I see none.

Can that be done at present ?—No, it must be an official copy.

Does not that add, in some cases, considerably to the expence of the trial ?—Much, where the drawings are expensive.

Do you know any cases in which the original rolls have been produced ?—In any cases it is allowed upon paying the clerk for carrying it up; I think it is two guineas.

Has not there been a rule lately made by the Master of the Rolls, that the original roll shall not be produced, except in very special cases ?—It is always done by petition; I never knew it refused.

Do you believe the present practice to be, that the original roll is taken out of the Rolls Office and carried to Westminster Hall ?—By the clerk who has the custody of it, upon petition to the Master of the Rolls to allow it.

Do you conceive that that permission is granted as a matter of course, or only under very special circumstances ?—I have considered it a matter of course.

You are not aware then that a rule has been lately made by the Master of the Rolls, which forbids the removing of the rolls, except under very special circumstances ?—I am not.

Do you not conceive that it is objectionable to remove the original records; are they not exposed to the danger of being lost or injured ?—There is the chance of miscopying, and that I should think would be the principal ground of wishing the original roll to be produced.

Must not any danger of miscopying be obviated by having the copy verified ?—I think it would be.

Is not that always insisted upon ?—The parties may examine it; but it is usually examined by the clerk and the parties that engross it.

Do you see any objection to amending the law, so that a person should be enabled at once to take out a patent for the three kingdoms, at perhaps the same expense that he has now to pay for taking it out for England alone ?—I see none; there would be this difficulty perhaps, that there are certain offices in the different countries that depend upon the progress of the patent for their emoluments; but that does not concern the patents themselves.

Is there much expense attending the inspection of specifications ?—It is 1*s.* if you know the date of it at the Inrolment Office, and 3*s.* 6*d.* at the Petty Bag and Rolls Chapel.

You are aware that in some of the public journals an account of the specifications is published ?—I am.

Do you conceive that all the specifications are published in those journals ?—I do not.

Do you conceive that it would be advantageous to have a complete list of those specifications published in any public journal or gazette ?—I have never given that much thought; but I should think it would not be so desirable; it has been supposed to give those persons who are anxious to evade the patent an opportunity of doing so; there have been several high opinions against it; I think the late Lord Ellenborough was opposed to it, and Lord Eldon.

Do you see any inconvenience in the time that is now given for inrolling the specification ?—None; the only one is keeping the public in a state of suspense for the time.

Do you conceive that two months is sufficient time ?—It depends upon the extent of the invention; some require twelve months.

Can you suggest any improvement in the present practice ?—Nothing, but that I think a patent should be quicker obtained, and the patentee secured from the commencement.

But you have no objection to the present expense ?—No; I have known them to get 130,000*l.* by a patent; they all run the risk of losing by it, and those who get so much, pay no more than those who lose by it.

You have stated that there is great uncertainty in maintaining a patent ?—I have.

Have you considered any means of rendering them more secure?—I have not considered any other means, except that of making them safe on the first application, and that after that, unless it could be proved that the thing had been practised before, the patent should be valid.

Do you think it would be desirable, in case of a patent being contested, to give the Attorney General the power of calling in the assistance of some scientific man?—I think it would, if they were on oath, that they should take no advantage of the information communicated to them.

Have you ever been concerned in obtaining the extension of patent rights?—Never.

What is the longest term you have know given for putting in a specification?—I obtained fifteen months for Colonel D'Arcy some time ago, as the legatee of Mr. Broderick, for putting in a specification; we have had two years sometimes.

Is not that length of time very inconvenient?—It is to the public.

Have you ever known a patent lost, from a disclosure being made by the servants of the applicant who had been engaged in making experiments?—Not exactly.

Do you think it would be desirable to adopt the course which has been suggested, that upon an application made to the proper authorities, the discovery should be made secure to the applicant till the issue of his patent, but that at the issue of his patent it should contain a specification?—It might be desirable.

Do you see any objection to it, provided the property of the inventor in his discovery was secured to him in the interval between the application and the issue of the patent?—I see none; but I think there might be objections to it which I do not see at present; perhaps lodging a skeleton specification first, and then afterwards making it up, would be desirable.

The proposal which has been made is, that upon application for a patent, the applicant should give the principal points of his invention without describing it in detail, but sufficient to mark the particular character of his invention, and that he should be secured of the property to that invention in the interval between his application and the issue of his patent; and that before the issue of his patent he should prepare his specification?—I think it might be a good plan.

Can you furnish the Committee with a detailed statement of the expense incurred at each of the offices in taking out a patent?—I have prepared a statement of the expense, which I will deliver in.

What is the additional expense of a patent for the colonies?—The expense for the colonies is about 5*l.* additional.

Have you ever been engaged in any law-suits for the maintenance of patents?—Never.

Do you know the grounds upon which they are usually set aside?—I have hardly ever been in court when they have been tried, but I have heard the reasons; they are generally for want of novelty, or else a bad title.

Mr. Wm. Newton, again called in; and examined.

Will you have the goodness to state to the Committee whether you have been considering any suggestions which have occurred to you for the improvement of the law with regard to patents?—With respect to the appointment of a consultive board, as it is called in France, it strikes me that it would be exceedingly desirable that such a board should be appointed to examine the petition and the specification; and I think it would be desirable that this board should have the power of saying for what period the patent should be granted.

Do you mean then, that the board should have the power of granting a patent for more than fourteen years?—I think it would be desirable that patents should be granted for various periods.

For more than fourteen years?—Under some circumstances. For instance, there are many trifling things, such as a patent for a new invented lace-hole for stays, a new invented fastener for gaiters, and such little matters as that, for which a patent should not be granted for more than five or seven years, in my opinion; but there are other matters of great magnitude, such as are connected with marine architecture, the construction of dams and fortifications, and things of considerable magnitnde, which the inventors could not be remunerated for in the course of fourteen years. In that case, I should say the consultive board should have a right to grant a longer term; and, upon application, perhaps it would be desirable, where they saw a reasonable ground, that they should be able to extend the limits of the original grant.

Will you state to the Committee what you conceive to be such a publication as will prevent a person obtaining a patent?—It seems to me to be a subject not well defined; the patent states, "make use, exercise and vend" the article; and upon that ground it is considered, that if any body has made, used, vended or exercised that thing before, that will prevent the patentee from enjoying the benefit of exclusive right to it. Now the publication of an invention in a book, is not either making, using, exercising or vending it.

Is it not notorious that the statement of an invention in a book would prevent a person obtaining a patent for it ?—I believe it is the ordinary practice; but it does not seem to me to be decided; in fact, that has been a question lately raised.

Has not it been stated as a rule of law, that a person cannot have a patent for a principle found in a book of science ?—It is very likely a rule of the courts; but I have not known an instance in which that has been acted upon; I should conceive it not a good patent, if the subject had appeared in print.

Suppose the invention was known to several persons, but had not been practised before the party applied for the patent ?—Then, I think, the party might apply for a patent; being the first who communicated it to the world.

Did you ever know an application to the Attorney General for an invention that had appeared in a book ?—The Attorney General would most likely know nothing of that fact; but if he had known that it had appeared in a book, he would very likely say, that the invention was published.

Do you know whether a communication to a servant in the course of an experiment, would be a publication ?—Certainly not; nor to your friend whom you might show it to in confidence.

Are you aware of an expression of Lord Eldon's, that if he was applying for a patent he would not communicate the secret to his brother ?—That I should consider to be exercising extreme caution, beyond what is absolutely necessary.

Are you not aware of several cases in which patents have been set aside, by persons to whom the inventions have been communicated having published those inventions fraudulently ?—Yes, I am aware of that.

How do you reconcile that with what you have just stated ?—The confidence was betrayed, and the person entrusted with the secret acted dishonourably.

Is not the law this, that communicating an experiment to a man who is necessary to the operation of that experiment, would not be a publication; but if that man told third parties, and they used it, that would become a publication ?—Yes.

Can you mention any case at law bearing upon this point ?—Yes, I remember that in the case of Webster *v.* Euther; it was attempted to be shown that a certain invention had been known before the date of Webster's patent, and they produced a tailor who had gone into the workshop to see his friend, one of the workmen, and had taken up a little implement that lay there, and asked what it was for; he was told that it was for a gun-lock; but the court ruled that that was not a publication of it. That trial took place three or four years ago.

On what ground was that held not to be a publication ?—

Because it was making by the work-people of Mr. Euther, privately; the patent was ultimately overturned upon another ground.

In what manner do you think the consultive board, as you have called it, should be constituted?—I should conceive that they ought to consist of lawyers and mechanics, but mechanics out of trade certainly; persons that should be fully competent to judge of the subject when placed before them; whether the specification was a fair description of the invention for which a patent was solicited.

What should be the powers which that Board should have, and what should be its object?—The first object should be to examine whether the specification ultimately delivered was the matter of fact sworn to, and generally described, in the first specification.

Would you require them to make experiments?—No, it would not be necessary; upon the comparison of the two specifications, it would appear whether they both contained the same subject, and gave a fair and clear description of the thing stated in the affidavit.

Would you give them the power of ascertaining whether the specification was a correct description of the invention?—I would not necessarily call upon them to take that pains; but if they thought proper to object to the specification upon any grounds, they should be at liberty to call the applicant, or his agent to explain further.

Would you consider them responsible for the correctness of the specification?—Certainly not.

What would be the advantage of their examining it?—That there should be nothing fraudulent, that the patentee should actually specify the very invention which he had sworn to, not one which he had subsequently picked up; and I would make them responsible so far, but not reponsible that it should be a perfect specification: they should look it over, and form a judgment whether it was a fair description.

How would they ascertain that it was not fraudulent, unless they examined it very carefully?—I think that might be done very readily.

In the case of a chemical discovery, how would they ascertain that the specification was accurate, without experiments?—That would be rather a peculiar case, because chemical theories are not so generally known as that a person could see at once the result of all combinations.

Are there many patents taken out for chemical inventions?—Comparatively very few; there is not, on an average, above one patent in a year for a medicine, and perhaps not above one or two in a year for dyeing; and those are nearly all the chemical patents that are taken.

With what powers would you invest the consultive board?—I think they ought to have the power of saying for what period the patent should be granted, according to their view of the value of the invention.

Would not you require that they should ascertain, very carefully, what the invention was?—Certainly; but I do not mean to hold them responsible for the specification being perfectly that which a competent mechanic might take in his hand and make the thing from.

Would not you make them responsible that the specification was a good one at least, before they issued the patent?—I should require them to look carefully into it, and if they objected to it, to call for further evidence.

Would not the circumstance of its having been used, and not objected to, up to the time of the application for an extension, be a sufficient evidence of the goodness of that specification.—No, that would be no positive proof that the specification was an exact description of the thing; it should be incumbent on the board to know what the patent was that was intended, but they should not be bound to see that every part of the thing fitted and acted as it was described.

Have you had any experience in lawsuits for setting aside patents?—Yes.

What is the most frequent ground upon which patents are set aside?—The want of novelty in some part of the invention claimed in the specification; it is generally for some trifling fault in the specification; it is scarcely ever that the broad question is argued in court, I mean, by taking the whole plan before them, and seeing whether the invention is original; but it is more frequently overturned upon some little point, or upon some legal question; it is very seldom that the merits of the question are gone into in court; if there is any faulty point, they take hold of that first.

In other words you mean to state, that many a person who in fact deserves a patent for a meritorious invention, loses it for some trifling thing?—For some trifling thing which he has included ignorantly or incautiously.

Have not the courts of late, construed the specifications as liberally as possible?—Yes, they have lately taken rather too liberal a construction, and they have sometimes considered what the specification never intended; formerly the rule was quite the reverse; at one period the specification was subjected to every degree of severity; now the recent decisions have established the patent as claiming what the patentee never intended; I state that upon my own knowledge. I allude to the case of a machine for shearing cloth, in which a rotatory cutter is introduced, shearing from list to list; and it has been established by a recent decision of the court, that every patent containing a rotatory cutter, shearing from list to list, shall be an infringement of the first; now I take upon myself to say, that the patentee never intended to claim the rotatory cutter in every mode in which it could be applied to shearing from list to list, because one of the patentees has told me so; but the court has so ruled it, and as they said, for the purpose of supporting a valuable invention, which it was stated 100,000*l.* had been made from; but the fact is, that it has placed in jeopardy, if not destroyed, nine subsequent patents, all employing rotatory cutters, shearing from list to list, but actuated by different modifications of machinery.

Would not this evil be remedied by expunging from the patent whatever had been before invented, and retaining what is actually new?—It would be very desirable that if there should be nine parts or combinations or things in a patent proved to have been used before, and the tenth an original one, that the tenth should stand alone.

Supposing in a specification it should be clear that one part of it was old and others new, could the court, however they might wish it, support such a patent?—According to the present system of things, I believe they could not.

Have the courts ever gone that length?—They have not exactly gone that length.

If those other persons who have taken the rotatory shears had in their specifications distinctly disclaimed all the parts that were invented before, and had taken only to themselves the portions that were absolutely new, would the court then have said that was an interference with the first patent?—In this case they took a very broad latitude for the import of the words "described method;" they considered that to mean the application of the rotatory cutter in all its ways; but the rotatory cutter is known to have existed before.

Do you think it would be expedient to amend the law so as to enable a person to take out a patent for an abstract principle?—I think not; I think a patent for an abstract principle could be of no use.

You stated that a patent should not be refused because some notice or hint of the invention had been given publicly before, but only on the ground of its being actually in use; do you propose that as part of the present law?—Yes.

Do you think that the patentee ought to be required to add at a future time any improvements that he may make to his original specification?—Certainly he ought to be at liberty to do it, if not required; he cannot very well be required; but if he fails to do it, he should lose the advantages of those improvements.

Is it ever considered in a court of law whether mistakes which may have arisen in a specification were unintentional; or is it taken for granted that any mistakes in the specification are fatal to the patent?—I have always found them fatal to the patent.

Do not you think that the intention of the party, in framing the specification, ought to be made a more prominent question in trials with respect to patents than it has hitherto been?—The intention ought to be considered, certainly; but it may sometimes be very difficult to get at the intention, because that may be concealed.

Do you conceive that any inconvenience arises from the present expense of taking out patents?—A very great inconvenience, and very great objection.

Do you see any way in which that expense might be lessened without inconvenience?—I think that if the government were to relinquish their charges, which would be nearly 60*l.* upon each patent, it would be a very great relief. That would leave all the officers in the possession of their fees. Whether it might be expedient to reduce any of the fees of the officers, is another consideration, on which I do not feel competent to speak; I should not like a patent to be a mere mercantile license; I think it still ought to be a grant from the King.

Do you think the evil you speak of would be removed by the reduction of the fees?—A greal deal of the evil would be removed, because the expense of soliciting a patent, altogether amounting to more than 100*l.* if 60*l.* was reduced from that, it would bring the sum down to about the price which I first considered would be acceptable.

With respect to a patent for Scotland and Ireland, would you leave the price as it is now?—No; I would include them in the same patent if it was desired, upon paying some of the fees that appertain to the officers.

That is to say, you would not wish the expense of a patent for Scotland, Ireland, and England to exceed 100*l.*?—No; but I think it would be desirable, if the three kingdoms were included in one patent, that the specifications should be deposited in the three metropolises, for the inspection of the public; because there is a great deal of advantage in exposing the specifications; parties would be deterred from spending their time and money in pursuing the same objects, by seeing that specifications of the things already existed.

(To be continued.)

New Patents Sealed in 1829.

To George Danre, of Birmingham, in the county of Warwick, manufacturer, for his having invented a self-acting air or gas regulator or stop cock, for governing the flow of air or gas, which may be applied to other purposes Sealed 2d Nov.—6 months.

To Thomas John Fuller, of the Commercial Road, Limehouse, in the county of Middlesex, civil engineer, for his having invented an improved mechanical power, applicable to machinery of different descriptions. 28th Oct.—6 months.

To John M'Curdy, of Great James Street, Bedford Row, in the county of Middlesex, gentleman, in consequence of a communication made to him by a foreigner residing abroad, by which he is in possession of an invention or discovery of certain improvements in the method of constructing mills and mill stones for grinding. 2d Nov.—2 months.

To James Viney, of Piccadilly, Colonel in the Royal Artillery, for his having invented certain improvements in steam boilers, and in carriages or apparatus connected therewith. 2d Nov.—6 months.

To James Soames, junior, of Wheeler Street, Spitalfields, in the county of Middlesex, soap maker, for his having invented or discovered a new preparation or manufacture of a certain material produced from a vegetable substance, and the application thereof to the purposes of affording light, and other uses. 2d Nov.—6 months.

To John Tucker, of Hammersmith, in the county of Middlesex, brewer, for his having invented or found out an exploding shot or projectile. 2d Nov.—6 months.

To James Stewart, of George Street, Euston Square in the county of Middlesex, piano forte maker, for his having invented certain improvements on piano fortes. 2d Nov.—2 months.

To John Cowderoy, of Britannia Street, City Road, in the county of Middlesex, gentleman, for his having invented certain improvements in machinery for making bricks. 2d Nov.—6 months.

To Francis Naish, of Stoneason, near Wells, in the county of Somerset, gentleman, for his having invented or found out certain improvements in the manufacture or application of silks, mixed or combined with other articles. 2d Nov.—2 months.

To William Gooch, of Mount Street, Berkley Square in the county of Middlesex, for his having invented certain improvements on baths of different descriptions, which improvements are applicable to other purposes. 7th Nov.—6 months.

To Daniel Macdougall, of Edinburgh, horticulturist, for his invention of certain improvements on or additions to syringes, applicable to garden and other purposes. 10th Nov.—6 months.

To Thomas Osler, of Birmingham, in the county of Warwick, chandelier furniture manufacturer, for his having invented or found out certain new improvements in the construction of glass and metal chandeliers and other articles for ornamental lighting. 10th Nov.—6 months.

To Joseph Gibbs, of Crayford Mills, in the county of Kent, timber merchant, for his invention of improvements in machinery for cutting marble, wood, and other substances. 12th Nov.—6 months.

To John William Dodgson, of Lower Shadwell, in the county of Middlesex, pump and engine maker, for his having invented certain improvements in ships' scuppers, and which may be applied to other purposes. 17th Nov.—6 months.

To Thomas Gethen, of Furnival's Inn, in the county of Middlesex, gentleman, for his having invented or found out certain improvements in dressing woollen cloths. 21st Nov.—6 months.

To William Clutterbuck, of Ozlebrook, near Stroud, in the county of Gloucester, for his having invented or found out certain improvements in the shears used for cutting or cropping of woollen cloth, and other fabrics requiring shearing. 21st Nov.—2 months.

List of Patents

GRANTED IN SCOTLAND SINCE MAY 20, 1829.

For certain improvements in making, constructing, or manufacturing cartridges, for sporting and other purposes. To John Dicken Whitehead, county of York.

For certain improvements in the machinery to be employed in making nails, brads, and screws. To Thomas Tyndal, county of Warwick.

For improvements in evaporating sugar. To William Godfrey Kneller, county of Middlesex.

For certain improvements in machinery or apparatus for propelling ships or other vessels on water, &c. To Orlando Harris Williams, Esq. county of Gloucester.

For a mode or method of converting liquids into vapour or steam. To John Braithwaite and John Ericsson, county of Middlesex.

CELESTIAL PHENOMENA, FOR DECEMBER, 1829.

D.	H.	M.	S.	
1	0	0	0	☉ before the clock 10 *m* 43 Sec.
2	2	0	0	♀ *m* conj. with γ in Libra
2	12	0	0	☽ in conj. with ϑ in Aqua.
3	6	33	0	☽ in ▭ first quarter.
3	9	0	0	♂ in conj. with λ in Virgo
4	2	0	0	☿ in conj. with 1 β in Scor.
4	2	0	0	☿ in conj. with 2 β in Scor.
5	0	0	0	☉ before the Clock 9 *m* 7 Sec.
6	8	0	0	☽ in conj. with *o* in Pisces.
9	1	0	0	☽ in conj. with γ in Taurus
9	2	0	0	☽ in conj. with 1 δ in Taurus
9	2	0	0	☽, in conj. with 2 δ in Taurus
9	2	0	0	☽ in conj. with *a* in Taurus
10	0	0	0	☉ before the Clock 6 *m* 56 Sec.
10	1	38	0	Ecliptic opposition, or ● full moon.
14	16	0	0	☾ in conj. with ξ in Leo.
14	21	0	0	☾ in conj. with *o* in Leo.
15	0	0	0	☉ before the Clock 4 *m* 34 Sec.
15	15	0	0	☿ in conj. with ϑ in Oph.
15	19	0	0	♂ in conj. with 2 *a* in Libra
15	21	0	0	♀ in conj. with ϑ in Capri
16	7	0	0	♉ in conj. with *B* in Oph.
17	4	0	0	☾ in conj. with τ in Leo.
17	16	0	0	☾ in conj. with β in Virgo.
17	18	4	0	☾ in ▭ last quarter.
18	7	0	0	☾ in conj. with η in Virgo
19	10	0	0	☾ in conj. with ϑ in Virgo
20	0	0	0	☉ before the Clock 2 *m* 6 Sec.
20	19	0	0	☾ in conj. with κ in Virgo
21	13	19	0	☉ enters Capricornus
22	11	0	0	☾ in conj. with γ in Libra
22	20	0	0	☾ in conj. with ϑ in Libra
23	13	0	0	☾ in conj. with φ in Oph.
23	23	0	0	♀ in conj. with γ in Capri.
25	0	0	0	Clock before the ☉ 24 Sec.
25	15	36	0	Eclipt. conj. or ● new moon
25	17	0	0	♀ in conj. with δ in Capri
27	15	0	0	☽ in conj. with β in Capri
29	17	0	0	☽ in conj. with ϑ in Aqua.
30	0	0	0	Clock before the ☉ 2 *m* 53 Sec.
31	1S	0	0	☿ in conj. with ψ in Sagitt

☽ the waxing moon.—☾ the waning moon

Rotherhithe. J. LEWTHWAITE.

METEROLOGICAL JOURNAL, FOR OCT. AND NOV. 1829.

1829.	Thermo.		Barometer.		Rain in inches	1829.	Thermo.		Barometer.		Rain in ches
	Hig.	Low	High.	Low.			Hig.	Low	Hig.	Low.	
SEPT. 26	52	38	30,26	30,25		OCT. 11	54	32	29,96	29,86	,45
27	51	29	30,30	30,25		12	58	33	29,84	29,80	,25
28	51	34	30,25	30,15	,2	13	48	34	30,08	29,93	,025
29	47	30	30,26	30,19		14	46	35	30,08	29,80	,05
30	55	30	30,06	29,96		15	54	38	29,86	29,80	
31	45	36	29,92	29,82	,15	16	42	28	30,21	30,06	,175
NOV. 1	43	26	30,07	30,03		17	40	20,5	30,26	Stat.	
2	48	29	30,11	30,09		18	42	28	30,28	30,26	
3	49	29	30,16	30,04		19	35	20	30,32	30,26	
4	51	37	29,80	29,56		20	31	18	30,26	30,23	
5	48	35	29,96	29,86	,125	21	34	19	30,26	30,06	
6	51	36	29,92	Stat.	,075	22	42	22	29,66	29,48	
7	48	35	29,85	29,82		23	42	34	29,66	29,56	
8	48	28	29,92	29,92		24	40	35	29,66	29,56	
9	48	31	29,96	29,93		25	35	26	29,66	29,55	
10	55	37	29,93	29,91							

Edmonton. C. H. ADAMS.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. XXII.

[SECOND SERIES.]

Recent Patents.

To JOHN LEVERS, *of the town of Nottingham, machine-maker, for his having invented or found out certain Improvements in machinery for the manufacture of bobbin net lace.*]—Sealed 3d March, 1828.]

SPECIFICATION.

"MY improvements in machinery for the manufacture of bobbin net lace applies to the working of a peculiar construction of machine, on what is commonly called or known as the *circular comb principle,* intended to be put in action by rotatory power, in which machine the bobbin carriages are driven along the combs, by the reciprocating movement of levers with pinions at the extremities of their shafts; these pinions take into a circular pendant rack, by the vibrations of which circular rack the operative parts of the machine are made to perform.

" The object of the present improvement is to give to the said pendant circular rack such a reciprocating action as shall cause it to drive the bobbin carriages at intervals, thereby leaving time between each movement for the shogging of the guide bars; the intention of which is perfectly understood by persons acquainted with the working of bobbin net machines of that description.

" These improvements consist in the construction and adaptation of a certain peculiar form of cam, with a vibrating lever, which are designed to give motion to, and direct the actions of the pendant vibrating circular rack above mentioned; the mode of constructing and adapting which said improvements to a circular comb machine is shewn in the following figures (see Plate VIII.)

Fig. 1, is a front view of a machine, upon the circular comb principle. Fig. 2, an end view of the same, taken at the right hand; and fig. 3, a vertical section through the machine, parallel to the last, but seen from the opposite side; in which three figures the improved parts are shaded, and the old parts shewn in outlines.

" The machine may be driven by a winch applied to the axle of the toothed wheel *a*, which taking into an intermediate wheel *b*, causes that to drive the wheel *c*, fixed upon the main shaft *d*. When this machine is to be actuated by the power of steam, wind or water, a rigger may be fixed upon the main shaft *d*, for the purpose of driving it by a band instead of the winch. Rotatory motion being thus given to the main shaft *d*, the cam *e*, and its horn or guide *f*, *f*, both fixed to the wheel *c*, are made to revolve. A long vibrating lever *g*, *g*, the fulcrum or pivots of which turns in brackets *h*, is attached at top by a jointed arm *i*, to the pendant circular rack *k*, *k*, and at bottom carries a friction roller *l*, which works in the groove between the cam *e*, and its horn *f*. It will now be perceived that the rotation of the cam *e*, will, by its excentricity, cause the levers *g, g,* to vibrate upon its fulcrum pivots; in doing which the arm *i*, at the upper end of the lever *g*, will be drawn to and fro, and cause the pendant circular rack *k*, to swing.

"There are pinions *m, m, m, m,* fixed on the ends of the longitudinal shafts *n, n, n, n,* which carry the levers that take into the indentations made in the lower parts of the bobbin carriages *o, o.* The teeth of the circular rack *k*, gearing into the pinions *m*, cause, by its swinging action above described the pinions with their shafts and leaves to reciprocate, and consequently to drive the bobbin carriages to and fro in the circular combs *p, p,* and thereby to produce the intervention of threads in a similar way to that effected by the ordinary circular comb machine when worked by hand."—[*Inrolled in the Rolls Chapel Office, Sept.* 1828.]

Specification drawn by Mr. Newton.

To Edward Forbes Orson, *of Finsbury Square, in the county of Middlesex, Gentleman, for his having invented an improved cartridge for sporting purposes.*—[Sealed 18th Sept. 1828.]

This invention is a shot cartridge, consisting of two cylindrical or poligonal tubes, made of paper, card or other fit materials, one of the tubes fitting into the other, so that the shots may occupy one tube and the gunpowder part of the other.

The tube for containing the shots having been made of dimensions to suit the bore of the gun, is to be divided in the middle transversely, by a disc of card, and then having been filled with the shots, the ends of the tube are to be closed by discs of wadding. The tube for the gunpowder is to be made sufficiently large to slide tightly on the outside of the shot tube, having a disc attached to one end.

The proper charge of gunpowder having been put into the larger tube, the smaller or shot tube is then to be inserted into it; and being pressed down, the powder will be secured from falling out.

When this improved cartridge is used in loading a fowling piece, the sportsman draws the shot tube out of the other, and after emptying the powder into the barrel of the gun, he throws away the powder tube, and pushing the shot cartridge into the barrel, rams it down, and thereby secures the whole of the charge by one ramming.

The Patentee claims as his invention the shot cartridge, so made that the shots may be separated from the powder by means of the sliding tubes, and proposes that the tubes be made octagonal, with circular ends of wadding. Cartridges made after the above plan, will be found to explode soon after leaving the muzzle of the gun, and by that means will conduct the shots more perfectly to the point desired.—[*Inrolled in the Inrolment Office in Chancery, March,* 1829.]

To JOHN BRAITHWAITE *and* JOHN ERICSSON, *of the New Road, Fitzroy Square, in the county of Middlesex, Engineers, for their new invented mode or method of converting liquids into vapour or steam.*—[Sealed 31st January, 1829.]

THE subject of this invention is a peculiar construction of boiler for generating steam, in which the heated air from the furnace is either drawn or forced through pipes of small diameter, which pipes constitute the flues, and are surrounded by the water contained within the boiler. By this contrivance, a very extended heated surface is placed in contact with the water, and steam is thereby generated with greater effect than in any other boiler heretofore employed for that purpose.

The peculiar construction of boiler herein proposed is applicable to the working of any kind of steam engine; but it appears to be particularly designed for locomotive steam carriages, in which situation it has been found extremely effective.

The Patentees describe their invention in the following words:—

SPECIFICATION.

"Our said invention consists in generating steam in a boiler, wherein the capacity of the flue is too small to allow a sufficient quantity of heated air to pass through it in a given time by the mere agency of what is commonly called atmospheric draught, and to which flue therefore we attach either an air-forcing at the furnace end, or an air-exhausting apparatus at the other end of the flue, in order, by these mechanical means, to compel the required quantity of heated air to pass through the flue in a given time, whereby we are enabled to expose a given surface of flue to such a quantity of caloric in a given time, as will generate more steam than has ever before been produced in an apparatus of equal capacity, and thus effect a great saving in fuel, and greatly diminish the size and weight of a boiler.

"Plate VIII. fig. 4, is a longitudinal section of a boiler for generating steam, according to the method which we claim as our invention, and through the flue of which the heated air is drawn, by means of an air-exhausting apparatus, which apparatus, for the purposes of this invention, we call an air-sucking pump; *a, a, a,* is the outer casing of the boiler; *b,* is the safety valve; and *c,* the steam pipe; *d,* is the furnace; *e,* one of the furnace bars; *f,* the ash pit; *g,* the furnace door; *h, h, h,* three air cocks, to admit atmospheric air to the top of the fuel in the furnace; *j,* an air cock, to admit atmospheric air to the bottom of the said fuel; *k*, *k*, *k*, *k*, the flue gradually diminishing in diameter from the furnace, in proportion as the heated air, cooling in its passage through the flue, gradually requires less vent; while another advantage of this form, is that the dust and dirt of the furnace has a constantly descending passage to escape at; which, together with the relative position of the different lengths of the flue being immediately under each other, prevents any inconvenience from dirt collecting in it.—*l*, is a double action air-exhausting pump, which we call the air-sucking pump; and it is evident, that if this pump be worked, any given quantity of heated air may be drawn through the flue from the furnace, in any given time proportionate to the action of the pump, the number or size of the air cocks, and the general dimensions of the apparatus. Fig. 5, is an end elevation of the boiler just described.

" Fig. 6, is a longitudinal section of a boiler for generating steam, according to the method which we claim as our invention, and through the flue of which the heated air is forced by means of an air-forcing apparatus, which apparatus, for the purposes of this invention, we call an air-forcing pump; *a*, *a*, *a*, is the outer casing of the boiler; *b*, the safety valve; *c*, the steam pipe; *d*, the furnace; *e*, a fire bar; *f*, the ash pit; *g*, a hopper, for feeding the furnace with fuel; *h*, an air pipe, furnished with a regulating cock; *m*, through which atmospheric air is forced on to the top of the fuel; and *j*, is another air pipe, also furnished with a regulating cock *n*, through which atmospheric air is forced to the bottom of the fuel; *p*, is an air-forcing apparatus, which we call an air-forcing pump, furnished with valves, as here shown, and an air regulator *r*, being a board, inclosed in a leather case, and acted upon by the weight *s*.

" It will be evident that this boiler, as far as the principle of our invention is concerned, will produce the same effect in generating steam, as that first described, the difference therein being merely in the mode of obtaining the required velocity for the heated air in its passage through the flue; but it is worthy of remark, that the modifications necessary to the adaptation of the principle of our said invention to these two forms of boilers, renders them respectively the better available for different purposes.

"In fig. 4, it will be observed that the furnace is horizontally placed, and may be fed from a door in the front as at *g*, in the ordinary way, while at fig. 6, the furnace is vertically placed, and must be fed from a hopper, as shown in the figure.

"Now, whereas we claim as our invention the converting of liquids into vapour or steam, by means of a boiler, wherein the capacity of the flue is too small to allow a sufficient quantity of heated air to pass through it in a given time, by the mere agency of what is commonly called atmospheric draught, and to which therefore either an air-exhausting apparatus, or the air-forcing apparatus hereinbefore described, is applied for that purpose, it being our intention to claim as new the application of an air-exhausting apparatus generally for such purpose; and the particular air forcing apparatus hereinbefore described, whereby, as well as in the air exhausting apparatus, the fuel is supplied with air both above and below, as shewn in the drawing annexed, which double supply of air, regulated by cocks as aforesaid we claim also as new.—[*Inrolled in the Inrolment Office in Chancery, July,* 1829.]

Specification drawn by the Patentees.

JOHN UDNY, *of Arbour Terrace, Commercial Road, in the county of Middlesex, Esq. for his having invented certain Improvements on the Steam Engine.*—[Sealed 14th January, 1829.

THE subjects of this invention are, first, a mode of employing the elastic force of one volume of steam, under different pressures, upon two pistons:—that is, first applying the steam under great pressure in a small cylinder, and then bringing the eduction steam into a larger cylinder, to act again under a diminished pressure. And, secondly, a peculiar construction of boiler or generater for the production of steam.

The Patentee explains his invention by the following description:

SPECIFICATION.

"My said improvements on the steam engine consist, 1st. in causing the same steam to act twice by means of three working cylinders, primarily, with its full density, throughout the stroke, in two of them, operating in each alternately; that is, one quantity of steam performing in the one vessel in its concentrated state, and in another measure producing its effect in the second, one after the other, such actions being the result of the increase of volume in the elastic fluid from a constant formation of it (without change of consistence or force), enlarging the vessel to accommodate itself in the only possible direction, viz. that of the course of the piston; and again, simultaneously, in like constant succession, but in a reverse rotation, making the steam which had so priorly acted, expand from these two vessels by its inherent elastic quality into the third (with a force diminishing according to a caculable ratio), having the whole internal surface of said first-action vessels as a fixed fulcrum, or point of abutment from which to dilate, at a time when each is solely appropriated to that purpose; the bearing upon both sides of the pistons of said first operating cylinders, during the dilation of the steam from their cavity being also equal and uniform, so as to obviate re-action or back pressure on the said pistons, and both of which powers of the steam are constantly, regularly, and at the same time in operation on the engine, and are rendered more effective by the existence of a vacuum on the side of both the pistons, opposed to that on which the steam is pressing, as shall be more fully hereinafter explained.

"And, secondly, in addition to the boiler of a steam engine, which will prevent the ill effects caused by the pitching of a vessel at sea, or by the motion of a carriage, and also to render all boilers to which it is applied more safe, and less liable to be destroyed.

"My first improvement in the steam engine aforesaid, by which the steam is made to act twice, in the manner and with the advantage before related, is effected by means of three working cylinders, as already stated, furnished with pistons and rods; two of these are to be considerably smaller than the third, the proportion of which difference should be at least equal to that between the density of the steam used in the first instance, and the pressure of the atmosphere, and may be much greater with advantage; thus, for instance, if the density of the steam be twice that of the atmosphere, the two smaller cylinders (which ought to be both of the same size), should be each only half the dimensions of the large one at most, and may be even but an eighth of that extent; and such comparative difference in the size of the cylinders may be increased, as the density of the steam first used is augmented; thus, the proportion between the two, when steam of a power of 60 lbs. per superficial inch is employed, may be as one to sixteen; if steam of 120 lbs. as one to thirty-two, and so on, in this progression, and may be to more than twice this amount, provided the vacuum be made perfect.

Plate IX. fig. 1, represents these three cylinders in one of the positions in which they may be placed, where letters *a*, and *b*, denote the two small, or first-action cylinders, and *c*, the large or expansion one; *d*, and *e*, the pistons of the two first, and *f*, that of the second-action cylinder; *g*, the pipe or tube from the boiler to the cylinder *a*; and *h*, a similar pipe from the boiler to the cylinder *b*: while *i*, and *k*, show the pipes or ducts from the vessels *a*, and *b*, to the condenser; the position of these four pipes is reversed in the two cylinders, so that the steam flows under one piston, and over the other, thereby causing the whole three to rise and fall together: *l*, shows the tube of communication between the small cylinder *a*, and the expansion one *c*, opening above its piston *f*; and and *m*, gives the pipe from the other small vessel *b*, to under the piston *g*, of the said large cylinder *c*. A pipe passes along the side of the cylinder *a*, externally, the terminations of which are shown by *n*, *n*, and a similar tube placed by the side of the cylinder *b*, has its openings or ends marked *o*, *o*; these two pipes or canals serve to equalize the density and pressure of the steam on each side of the pistons *d*, and *e*; or in the whole area of the cylinders *a*, and *b*; a tube from the bottom of the large cylinder, marked *p*, and one from its top, marked *q*, both run to the condenser; the piston rods of the cylinders *a*, and *b*, are marked *s*, and *t*, and that of the large one is denoted by *u*; and a bar or transverse piece, which connects the three piston rods, is marked *j*, *j*; and the valve boxes are represented by *v*, *v*, *v*, *v*.

" The condenser with its air pump, the engine beam and the frame, by which it is supported, the connecting rods, boiler, the apparatus for working the valves, pumps, and other gear, the fly wheel, governor, and some other less important parts, are so similar to those used for the same purposes in other engines, as not to require a particular description, and are not represented in this figure, and they may be made of any proper material, and constructed and arranged without difficulty by any sufficiently qualified engine maker.

" I have given the preference to cylinders for this machine for the same reason which causes them to be universally used in other steam engines, but wish it to be understood that vessels of any form may be employed, provided they be equally fit for the operation of pistons; and the terms above, below, top, bottom, or otherwise, when heretofore used, and in all time hereafter, are to be regarded but as relative, and not implying that it is absolutely necessary to place the machine or its parts in any definite position, except when otherwise particularly directed.

" In order to understand the manner in which this steam engine operates, let it be imagined that, for example, the three pistons are to be made to ascend, then the pipe *g*, from the boiler to the bottom of the cylinder *a*, and that marked *i*, from its top to the condenser, should be opened by a proper disposition of their valves; and at the same time, the tube *o*, which forms a communication between the top of the cylinder *b*, and its bottom, should be also opened, and likewise the tube *m*, which passes from this latter cylinder to the lower end of the great or expansion cylinder *c*, and the tube *q*, which goes from the top of the said great cylinder to the condenser, should be both opened; and while the pipes particularized are thus opened, the apparatus that works the valves is to be also at the same time so managed as to close the tubes marked *h*, *k*, *l*, *m*, and *p*; before explained. On the contrary, when the three pistons are required to descend, then the pipes last named, viz. *h*, by which steam flows from the boiler to above the piston *e*, of the cylinder *b*; and *k*, by which a vacuum is produced beneath it; *n*, by which steam passes from below to above the piston *d*, of the cylinder *a*; and *l*, by which the same dense steam farther expands to above the piston *f*, of the cylinder *c*; and *p*, by which a vacuous state is produced under the said piston, are to be opened; while simultaneously *g*, *i*, *m*, *o*, *q*, already before explained, will be closed. In the case first described, when the pistons are to be made to ascend, on the valves being so disposed as to open the proper set of tubes, and to shut those, the actions of which alternate with or act contrary to them, the pressure of the steam from the boiler will operate regularly throughout the stroke with its full density, by the pipe *g*, on the under surface of the piston *d*, while there will be a vacuum above it, and of course it will be sent up to the top of the cylinder with the whole energy of the elastic fluid, and at same time the dense steam which had before acted in depressing the piston *e*, in the cylinder *b*, will pass by the pipe *o*, to below it *e*, making equal strain on both its surfaces, and offering no opposition to its being carried to the top of its cylinder by the action of the steam on the two other pistons, and said dense steam will farther dilate along the pipe *m*, to under the great piston *f*, which it will raise with a force multiplied by the excess of the area of the large cylinder over that of the small one; at first, and ultimately, with a pressure more or less diminished, according to the comparative size of the cylinders, and the perfection of the condensation; which condensation results from at the same time the pipe *q*, being open from above the before-named piston *f*, to the vessel in which the steam is destroyed, or re-formed into water: the dilation of the steam just alluded to, from the cylinder *b*, into that *c*, as a second effective power, takes place from the whole internal surface of the first-named vessel *b*, which serves as a fixed point of abutment, or back pressure for it.

In the second case, when the pistons are to be made to descend, the valves being disposed as required for the occasion, and as before related, then, in like manner, the steam from the boiler acting through *h*, on the upper face of the piston *e*, while there is a vacuum below it, will press it down, and that which had just operated in elevating the piston *d*, will pass from below to above the said piston, pressing uniformly on both its surfaces, and (accommodating itself as freely to the change of capacity in the spaces on each side of the piston *d*, aforesaid, as the dimensions of the pipe leading from one end of the cylinder to the other will permit of,) will not prevent the piston *d*, from being carried without resistance, to the bottom of its cylinder, by the power of the steam on the two other pistons, and the said dense steam will further expand out of the cylinder *a*, by the tube *l*, on the superior face of the piston *f*, below which (the pipe *p*, being open to the condenser) a vacuum will be produced and maintained, and it will force down the said piston *f*, with a power, as before calculated, in the up stroke; the said dilating steam having the walls of the cavity of the cylinder *a*, as a fulcrum or point of resistance, as the other had those of the cylinder *b*, in the last stroke, as already explained.

It will be observed in the preceding account of the engine, that the steam is continually passing into one or other of the two small cylinders, and from them again into the large cylinder, in rotation; that it operates, first, in raising the piston of the small cylinder, and then in depressing that of the large one, or vice versa; and that it never re-acts or counter-presses on the pistons of the small cylinders, while it is dilating from them, one of which pistons is returning to the point of action, when the steam is operating on the other, and it will be seen at once how the operations of the engine may be continued, ad libitum.

Several variations may be adopted in this engine, consistently with the principles which I have explained.

Firstly, The size of the two small cylinders may bear several different proportions to that of the large one, as before noticed. Secondly, The shape of these vessels may be made to assume various differences, with the precautions before stated. Thirdly, The relative position of the cylinders to each other may be changed from that represented in the first figure; the situation of the pipes, and other parts, being varied accordingly,

" Thus, as in fig. 2, the large and one small cylinder may be placed under one end of a beam, and the other small one, under the opposite end, the steam being admitted to the bottom of each small vessel, and the vacuum being effected above their pistons, or all the cylinders may be at one end of the beam. One small one being above the other, so that the same piston-rod will do for both small vessels, passing through the upper to the lower one; or, the two small cylinders may be placed at one end of the beam, and the large at the other, and so forth.

" Fourthly, The general position of all the cylinders may be changed from that which is vertical, and which I think the best, to one which is horizontal, or inclined in various degrees; the shape, &c. of the parts of the engine being altered consistently. Fifthly, The engine may be wrought with the common condenser, or, as I would advise for various obviously beneficial reasons, with two condensers acting alternately, one being connected by the eduction pipe to the small cylinder *a*, and the space above the piston *f*, in the cylinder *c*, and the other to the cylinder *b*, and the space under the said piston *f*. Sixthly, It may be wrought by high-pressure steam, without any condensers; the steam after it has operated on the expansion piston being driven off into the air, by what are now the eduction pipes, or ducts to the steam destroyers. Seventhly, The number of cylinders may be increased beyond three, which I consider enough to answer the ends I gain. And Lastly, The tubes marked *n*, and *o*, may be superseded, and consequently omitted, by making adequate perforations through the two small pistons, and furnishing them with valves, to which levers are to be attached, which levers will project from the pistons, so that they shall come in contact with the inner surface of the extremities of the cylinders, when the pistons approach them, and open and shut these valves; thereby, in one case, allowing the dense steam, which had acted on the piston, to go through the aperture, and equalize the density and pressure in both chambers of the cylinder, and in the other instance making a solid surface for the steam to operate on.

" This will be still farther elucidated by fig. 2, in which A, denotes one small or first-action cylinder, and B, the other, while C, shows the great cylinder; *i*, is the pipe from the boiler to A, and *h*, that from the said boiler to B; *i*, and *k*, are tubes from A, and B, to the condenser; *d*, *e*, and *f*, are the three pistons with their rods; *a*, and *b*, are the openings in the pistons *d*, and *e*, with their valves, &c.; the other parts are like the same ones in the other engine. The piston *d*, having come to the bottom of the cylinder A, the projecting handle of the valve *a*, will touch and shut the valve, while at the same time the upper handle will be thrown out from the surface of the piston, and the steam will then act on the piston to elevate it; at the time that this occurred here, the upper handle of the valve *b*, would also touch and open it, throwing the opposite lever out from the under surface of the piston *e*, and the steam which existed dense beneath the piston, would flow to above it, and then into the cylinder C; and thus the actions will be carried on reciprocally, as long as wished.

"The pipes *i*, and *q*, to the condenser or the air, from above the pistons *d*, and *f*, in the first figure, and those *k*, and *p*, from below the said piston *f*, and that of *e*, to the same destination, may be joined in pairs, and farther connected, so that the valve which closes one pair, will open those, the action of which is contrary to them; *n*, and *l*, may also be joined, and *m*, and *o*, and one valve will be appropriated to all, in the manner last told; and the two pipes from the boiler may be so united, that one valve will also do for both. This engine is to be set in motion, stopped, or have its actions moderated or reversed, by the means usually employed in other engines.

"My second improvement on the steam engine consists of an addition to the boiler, by which the ill effects are prevented to which boilers are liable when used at sea, or in a carriage, from the motion, and which will render all boilers more safe to which it is applied, and less likely to be essentially deranged. It consists of a pipe or tubes running from the upper part of one end or side of the boiler over its top, or along it, laterally, to the opposite point, at or about the same height, as represented in fig. 3, where the position of one of such pipes is given. Through this pipe or ducts the steam, if from any cause compressed in one part of the boiler, will find its way to another, so as to render the action in all parts of the cavity regular and uniform; and to prevent a jet of the elastic fluid from being thrown off by the safety valve, from the agitation of the water in the boiler, in consequence of the pitching, or rolling, or lurching, of a vessel, or carriage, by which great waste is occasioned.

"These pipes may be made of copper, or other material thought best, and should be so much weaker than the boiler itself, that in the event of too great a pressure they may burst first, and thus prevent the destruction of that essential part, and the mischief likely to arise from it.

My claims to the before recited and described improvements on the steam engine do not relate to every particular part of the various kinds of apparatus that I have mentioned, several of which parts must be common to many other engines, but are confined to the principles that I have suggested and elucidated, and the new and peculiar combinations I have employed, and set forth, to effect the purposes I pointed out, and the ends I have gained and arrived at.

And First, I claim as my invention, my first recited improvement on the steam engine, by which the same steam is made to act twice, by means of three working cylinders, which number I am the first to employ, in this manner, and with the like intention, as fully set forth hereinbefore. But be it understood, I do not claim as my invention the making the steam to operate twice: once with its full density, as it is formed, and again expansively; but for obtaining such double effect, as I have explained, constantly and regularly, so as to give the two powers of the steam to the engine, at the same time, unremittingly, unvaryingly, and unceasingly, and without, (in the second part of the operation of the elastic fluid,) occasioning reaction or back-pressure on the pistons of the first-action cylinders, as in all attempts to effect the purposes attained to heretofore, and both powers of the steam being rendered more effective, by the co-operation of a vacuum, in each instance, never before accomplished.

Secondly, I claim my second recited improvement on the steam engine, in the addition of pipes to a boiler, in the manner described, so as to prevent the accidents which may be caused by the agitation of the contents from motion, to render it less liable to burst, and not so likely to do any serious mischief, should one or more of the pipes give way, and in the last case, to cause it to be still effective, as fully set forth in my foregoing explanations and descriptions.—[*Inrolled in the Petty Bag Office, March,* 1829.]

Specification drawn by Mr. Farey.

To ANTOINE ADOLPHE MARCELLAN MARBOT, *of Norfolk-street, Strand, in the county of Middlesex, merchant, in consequence of a communication made to him by a certain foreigner residing abroad, with whom he is connected, for an invention of certain improved Machinery for working or cutting Wood into all kinds of Mouldings, Rebates, Cornices, or any sort of Fluted Work.* [Sealed 3d February, 1827.]

THE machinery which forms the subject of this patent is upon the same principle as the machinery of a circular saw-mill. There is a rotatory cutter perpetually revolving, and beneath it the pieces of wood intended to be cut into mouldings are placed, and progressively slide forward so as to come under the operation of the revolving cutter. There appears to be but little novelty of construction in this machine; and it is for this reason, we presume, that the Patentee disclaims any exclusive right to the distinct parts of it, but states that he claims the general construction as the matter for which the patent is granted.

Plate IX. fig. 7, is an elevation of the side of the machine; *a*, is a rigger fixed upon the driving axle, which is supported on the side frames *b*, *b*. These side frames rest on legs, and are braced together by cross pieces, upon which the bed of the machine bears, as shewn by dots. The pieces of wood intended to be grooved are fastened to a sliding carriage *c*, shewn by dots, which is made to traverse along the bed.

The cutter *d*, consists of a series of chissels or gouges, mounted on an axle, turning in plummer boxes bearing on the side frames, which being made to revolve with great rapidity, chips off small portions from the pieces of wood under operation, as they progressively move forward, and by that means cuts them into grooves or mouldings according to the forms of the chissels or gouges employed.

The rotatory power of a steam engine being communicated through the band to the rigger *a*, the whole of the machinery is driven by the following means:—On the axle of the rigger *a*, there is a large wheel *e*, from whence an endless cord extends round a rigger *f*, on the axle of the cutter, from whence the cord proceeds to an adjustable pulley *g*, and thence to the great wheel again: thus, by the rotation of the rigger *a*, and the traversing of the endless cord, the cutter is made to revolve with great rapidity.

On the end of the axle of *a*, there is a toothed pinion *h*, which drives the toothed wheel *i*; and affixed to the side of this wheel there is a small spur wheel *k*, the spurs of which take into the links of an endless chain *l, l, l, l*, distended over a similar spur wheel *m*. A portion of this endless chain is supported in a trough *n, n*, at the side of the machine, for the purpose of keeping it in contact with the teeth of a spur wheel *o*; and hence as the endless chain traverses, the wheel *o*, is driven round slowly, the axle of which having a connection with the sliding carriage *c*, shewn by dots, the pieces of wood intended to be grooved are by this means progressively slidden forward under the rotatory cutter, and the grooves or mouldings thereby formed.

There are provisions for various adjustments of the machinery, and for stopping or throwing it out of gear; but the general construction being understood, the minor details will perhaps be considered to be unimportant. [*Inrolled in the Petty Bag Office, April,* 1827.]

To CHARLES CHUBB, *of St Paul's Church Yard, in the City of London, Patent Lock Manufacturer, for certain Improvements in the Construction of Latches, which may be used for fastening Doors or Gates.* —[Sealed 7th May, 1828.]

The object of this improvement is the construction of a door latch which is intended to be acted upon like a tumbler lock, by means of a key having steps or indentations on the bit. The latch is made by the union of several thin plates fitting close together, all of which act as levers upon one common centrepin or fulcrum. The under part of each plate of this compound latch having a notch in it of a different depth, the indentations on the edge of the key are made of different heights, so that on turning the key which belongs to the latch, the several plates composing it will all be brought up into one coincident line, and allow of the latch passing out of its limited staple or catch, and the door opening. But if the indentations of the key do not exactly fit, which must be the case with a false key, the plates will not coincide, but be raised to different heights, and hence the latch will not pass through the aperture of the staple. A latch therefore on this construction affords the same secure protection that is found in a tumbler lock, and is much more simple in its construction.

The Patentee says, " The object of my improvements is to render latches of the above description more secure (than those heretofore in use) from being lifted or unfastened from the outside of the door or gate, by means of picklocks or false keys. In other respects, latches constructed according to my improvements have the same properties as those in common use, viz. they can be opened or disengaged from the inside of the door or gate by their turning handles, or from the outside by their keys, and also my latches will fasten of themselves in the usual manner in shutting the doors or gates, and with the same facility.

" The essential principle of my improvements in the construction of latches, which may be used for fastening doors or gates, consists in combining two, three, four, or more distinct moveable latches, to act in concert for one fastening; they are applied side by side in parallel planes, or one behind the other, all being mounted on one centre-pin, and being moveable about the same, but so that as each latch may be capable of such movement by itself, quite independently of the movements of all the other latches; and the outer or moveable ends of all the said combined latches are adapted to engage or catch within or behind the hooked part of one fixed hasp, and thereby to secure the door or gate from being opened in the same manner as the single latch commonly used; but in addition to the said fixed hasp, so adapted to receive the ends of my combined latches, it is formed with two hooked or catching parts, one disposed opposite to the other, in such manner that the combined latches cannot be unfastened, unless the outer end of every one of the separate latches is previously raised, moved, or lifted, (either by the key, or by picklocks, or by the handle,) in such manner as will place all those ends in one precise position, and they must all assume that position at the same time, for in that position alone can the outer ends of the combined latches be disengaged or unfastened, so as to withdraw them from between the opposite points of the double hooked catches or catching parts of the fixed hasp, because by my arrangement of such combined latches and double catches to the hasp, if the outer end of any one of the latches is moved too far or beyond that precise position, or if any one is not moved far enough, that one latch which so fails of being precisely placed, will catch behind one or other of the hooked parts of the hasp, in a sufficient manner to secure the door, even though all the other latches may be properly placed, so as to offer no impediment to unfastening."

Plate IX. fig. 4, shews four plates, *a*, *b*, *c*, *d*, put together as levers on one fulcrum pin, *e*. These plates, when brought into coincidence, form a solid latch; their ends extending one beyond the other, and turning over in a right angle as a rebate. Fig. 5, shews a metallic box, containing a latch composed of the several plates as described, which, by means of the indentations on the bit of the key, *f*, acting against the under parts of the several plates, are brought up into coincidence, and the latch is enabled to pass from the staple between the hasp *g*, and the upper piece *h*; the staple being shown in section in this figure.

Fig. 6, is another representation of the staple seen edgeways, in which *g*, is the hasp and *h*, the overhanging piece above it, between which the compound latch must pass on opening the door.

The several plates constituting the latch may be acted upon by springs *i*, (fig. 5,) at top, or may be allowed to fall by their own gravity; and the knob or handle, which is usually appended to the better kind of door latches, may have a bit, as at *k*, constructed like the bit of the key, for the purpose of opening the door on the inside.

In order to give greater security to these latches, it is proposed to attach to some of them a sliding bolt *l l l l*, on which the key may also act to project it forward, and when raising the latch, may at the same time shoot the bolt back. It is unnecessary to shew this sliding bolt distinct from the lock, as it is of the same construction as in Chubb's patent lock. (See Vol. IX. page 416, of our First Series.)—[*Inrolled in the Inrollment Office in Chancery, November*, 1828.]

To FERDINAND DE FOURVILLE, *of Piccadilly, in the county of Middlesex, merchant, for certain Improvements in Filtering Apparatus.* [Sealed 26 March, 1827.]

THE subject of this invention is not an apparatus of a peculiar or novel form, but merely the arrangement of materials through which the water is to pass in order to filter and clarify it.

A vessel being provided capable of receiving the water, and having a false bottom of open rails or perforated boards: on this bottom a layer of sponge is to be laid, and upon it a layer of coarse river sand. On the top of the coarse sand a layer of fine sand is to be placed; and above this a strata of pulverized charcoal. Above the charcoal, similar layers of fine and coarse sand are to be spread, and on the top of all a layer of broken flints, of equal sizes.

Such is the invention described in the specification of this Patent; but in what the novelty consists we are unable to inform our readers. [*Inrolled in the Inrolment Office, in Chancery, September,* 1828.]

REPORT

Of the Select Committee of the House of Commons on the Laws of Patents.

(Continued from page 180.)

Mr. Walter Henry Wyatt, called in; and Examined.

Have you any observations to offer upon the subject of the patent laws?—The subject of patents is one which I have been intimately considering for many years; and my opinion is, that great inconvenience arises from the present mode of granting patents.

In what way have you been led to turn your attention to the subject of patents?—I am the editor and proprietor of the Repertory, a work which has been published for the last thirty years, in which verbatim copies of the specifications inrolled, are are published. We get at them two ways, either by paying for copies at the office, or by the loan or communication of the originals from the patentees themselves. That work contains many hundred copies of specifications the same as in the office; and also contains a list of every patent that has been obtained since the year 1795; and I have a private volume containing a list of every patent that has ever been obtained since the time of James II., in the order in which they have been obtained according to the dates, with an index to their names. The Repertory forms now a very voluminous publication, and is to be met with in a great many public libraries, and is consequently very easy of access to inventors; but inventors seldom are readers. In In the year 1794, when the Repertory was first published, the number of patents in a year was about fifty odd; and it has subsequently increased to two or three hundred for England alone.

Do you know how many patents were obtained in the time of

King James?—I believe one or two; there are very few patents till the year 1796. I believe public attention was then drawn to it from the publication of the Repertory, which then originated.

Has the number of patents increased of late years?—They increased during that period when every thing was alive, but at the present moment they have decreased very much; there are from five to a dozen in the course of a month only. On the first day of every month I publish a list of every patent that has been obtained during the preceding month.

Do you conceive that the granting of patents has tended to stimulate inventions much?—I conceive that it has not only done that, but that the system of patents has been a greater spur to the improvement of the arts and manufactures in this country, than any other system that could be adopted, for no sum of money will gratify an inventor; if it is indefinite, his expectations are very great.

Are you acquainted with the law of patents?—Not as a professional man.

Do you know whether it is a general complaint that the law is very uncertain?—I believe universally; there are great inconveniences from the present system. The first and most prominent is the system of caveats, which tends to mislead all uninformed inventors, I mean persons whose attention has not been directed to the law of patents. The first impression, and it is almost universal, is, that entering a caveat is obtaining a sort of little patent, and that they have all the benefits of a patent for the expense of entering a caveat, which is 20*s*. during the year, and persons under the fancied protection of that caveat, commit acts that render the patents afterwards of no effect.

Does not that arise from their not taking sufficient pains to inform themselves as to what the law is?—Certainly; but it is so universal, that I have never been able to see a cure for it.

In point of fact, is a caveat of any great value?—A caveat is of value under certain circumstances and limitations; for instance, if a person contemplates taking out a patent for an invention which he has not perfected, it prevents another person from anticipating him, and thereby excluding him, because he has notice of the application; and if his invention be the same, he has an opportunity of participating in it by an arrangement between the parties. I have known where parties have claimed a patent, and been opposed by caveat, that a compromise has taken place between the two applicants, so that both parties have participated in the patent jointly obtained.

In those cases do you conceive that both parties were in fact fairly entitled to a patent?—In some instances; but I have known instances where parties have fished out the information by means of their caveat, and have participated. I have known mischief arise from the different periods for inrolling specifications. A person who has a patent for an improvement on the steam engine or any other invention, will have perhaps six months to enrol his specification, and another person who takes out a patent immediately afterwards, may have only two months, then the person who is compelled to enrol his specification in two months has no protection against the man who has six months incorporating the invention which he has inrolled in his specification. By that course the person who took out the prior patent, may totally defeat the other.

As the patent takes effect from the date of the sealing, how can that happen?—Supposing a person takes out a patent on the first day of July for certain improvements, with a power to enrol his specification within six months, and another person obtains a patent on the second of July for the same object, as is frequently the case, in the precise words with a power to inrol within two months, when his specification is inrolled, there is nothing to prevent the man who has six months, incorporating the one that has been inrolled within two months, if he is dishonest enough to do it.

Will not incorporating the substance of the other patent vitiate his own?—If you can prove that he has not invented it; but that is a negative which you cannot easily prove.

On that account it is presumed most parties take the longest period granted by law for inrolling their specification?—They do, for that and other reasons, and in doing that, no great expense is incurred, nor any perjury; because in preparing affidavits to obtain time, the words I have introduced are, "that the petitioner hath directed petitions to be presented to His Majesty, praying letters patent," but he does not go on to say that it his intention to take out the letters patent. The affidavit used formerly to go on to say that it is the intention of the party to complete them.

Are there any means of ascertaining the nature of the caveats that take place in respect of patents?—With reference to the Attorney and Solicitor General, whose clerks keep lists.

What do you think of the policy of preventing a person taking out a patent for an invention discovered by a British subject, and permitting him to take out a patent for an invention communicated to him by a foreigner residing abroad?—I think the policy of permitting patents to be taken out for inventions communicated from abroad is very good, because the great object is to improve the manufactures of the country, and whether it is done by invention here or invention abroad, I think the object is desirable; we are indebted to the Americans for a great many important inventions which come under that denomination. I think that so far as the law prevents a patent from being taken out for an invention communicated by a British subject abroad, it should be altered.

Have you any other observations to make upon the patent laws?—There has been much complaint as to the expense of patents; I am of opinion with the last witness, that if you decrease the expense much (and unless you did, it would be no benefit), it would so increase the number of patents, that they would become a public nuisance; for, notwithstanding the great expense of obtaining patents, there are patents continually obtained for the most trivial, absurd, and old things.

Does not the expense of patents operate very unequally upon different inventions?—I am not aware that the cost of a patent upon any article of importance has ever been an object after the first year.

Are there not many inventions the success of which must necessarily be limited to the first or second year, and afterwards the thing from its very nature will be forgotten, such as the kaleidescope?—That is an instance I had in my mind the moment the subject was alluded to; but that invention, though it was only popular for a very short time, was so popular, that I apprehend the expense incurred in obtaining the patent was no object; and I do not recollect any other instance.

May there not be many articles of fashion which last only for a season?—There are articles, such as straw hats, and things of that sort; but still the sale has been very great, if they have been at all encouraged

Would it not be fair for such ephemeral inventions to allow a person to take out a patent for a shorter period than fourteen years?—I should apprehend more inconvenience than advantage would result from such a course.

Would it not be a better check to patents being granted for frivolous inventions, if the parties who were to judge of the propriety of granting patents were more narrowly to sift them in the first instance?—It would certainly be a check, but I do not perceive any advantage in that check, but a great deal of discontent would frequently arise; parties would complain of being prevented.

Have you any other suggestions to offer to the Committee with regard to the patent laws?—I conceive that all the defects, or at least a great portion of them, might be remedied by a very different mode of obtaining patents. The present mode, which is dependent upon the King's leisure for signing patents, which he is called upon twice to do in every patent, is a very great inconvenience to the subject; because I have known patents to be delayed several months waiting for His Majesty's signature, during which period the invention has been discovered by others, and the patent rendered of no effect.

Would your idea be to dispense with the sign manual?—My notion is, that if the Crown would allow the prerogative to be interfered with, an Act, authorizing the patent to issue from an office, would be an improvement; and I think that if a specification were made, the first course to be adopted, instead of the last, that would be an improvement; I think if the specification took the place of the caveat, and were entered for twelve months, or some definite period, with power to substitute at a a certain period a more perfect one, it would be an improvement; that is, that the patent should take date from the lodgment of the specification, and that the party should be at liberty to consult all the world in preparing his specification.

Would you have that temporary specification detail the invention in some degree?—I would have it so perfect, as that the parties could make it subject to revision from the experiments and inquiry of others.

And of course, the thing described in the subsequent specification must be fairly deducible from the thing laid down in the first specification?—Certainly, it must not travel out of that.

Would you have the first specification go into considerable detail?—I would have it as perfect as the parties could make it from their own mind, or their own confidential friends assisting them.

Would it not be an evil to allow a very general specification to be made?—Certainly; I would make that first specification, if possible, a perfect one, subject to all the rules by which specifications are now drawn: I think it would also be an improvement if all specifications were inrolled in one office; and I think it would be better if they were not literally inrolled, but copied into a book; I think it would be very advantageous if all the specifications were collected from the several offices, and properly indexed and properly made out, so that they would be of easy access.

Are they of easy access at present?—I think not.

Are you aware of any classed list that is made out?—No perfect one. The best book of reference upon such subjects, as far as it goes, is Dr. Young's Lectures; but in the office there is no list, but a list of the names.

So that a person, wishing to learn at the public office what patents had been taken out, would have to make a very long search?—A very long search at the Inrolment Offices; they could give him no information but such as he particularly inquired after.

Mr. Francis Abbott, called in; and examined,

HAVE the goodnesss to state to the Committee the process of taking out a patent from the first application at the Secretary of State's office, or from the first putting in the petition, to the final sealing of it?—It is sometimes usual although not necessary, to enter a caveat as the first step, which is considered as a kind of precaution that a patent shall not be run against the applicant, as soon as it is known he is applying; for there are already caveats in, and immediately his reference comes to the Attorney General it is circulated about, and if any casualty happens to delay him, there have been instances where somebody else has got a patent on the same subject, while he has been, from some cause or other, delayed; but it is usual in many cases to enter a caveat previously to making an affidavit; when, after entering the caveat, or without entering the caveat, the first step is the affidavit made by the person, that he has either invented, or has had communicated to him by a foreigner, some discovery. Having made that affidavit upon it, a petition is presented to the King, praying a grant of Letters Patent for England, Wales, and Berwick-on-Tweed, or with the addition of the colonies; the colonies are frequently omitted because it is attended with some extra expense, and in many inventions it would be of no use to embrace the colonies; that petition being presented to the King, through the Secretary of State, a reference is made by the Secretary of State in the name of the King, to the Attorney or to the Solicitor General to report. I am confining my observations now to the application for an English patent, not for an Irish or a Scotch patent; the Attorney and Solicitor General on having the reference submitted to him, either makes a report in favour of the application, or it is stopped by caveats if there are any caveats; the clerk looks over the books, and finding any caveat for a patent on the same subject, the applicant is delayed a week from the time that notice is given for those who have received notices on their caveat to decide whether they will oppose or no, if within that week the person having had notice says he shall oppose; the next step is to take out a summons for the hearing before the Attorney or Solicitor General; a week's notice more is given of that appointed time, he at that appointed time hears the parties if they attend; but it is too frequently abused by the parties who have said they should oppose, not opposing, and sometimes a patent is delayed a fortnight or three weeks; sometimes the Attorney General cannot grant a patent; sometimes the Attorney and Solicitor General are so occupied with other concerns they cannot attend, and a man is frequently delayed a fortnight or three weeks by somebody saying he shall oppose, and when the time comes, just at the hour of appearing, saying he does not oppose, or he does not attend; and instances have arisen, where patentees, have been brought some hundreds of miles to support their application, and when arrived no opposing party has appeared. In a very recent case I was applying for a patent, I was delayed near a month just in that way; the intimation was given, but the party did not withdraw his opposition until the time appointed for hearing, and then he came and said "I am not prepared," or "my party is not come," or something of that description. If the parties attend they are heard before the Attorney or Solicitor General, first the applicant and then the opponent; and then if he sees any reason to think there is an interference, he stops it; he exercises his own discretion on it, governed of course by what transpires on the examination of both the parties; if he thinks there is no interference, between the applicant's and opponent's invention he makes his report in favour of the application; that report is taken back to the Secretary of State's office for what is called the King's warrant; that warrant recites shortly that such a person has applied for a patent, and that the King is advised to grant it; and he, in general terms, directs the Attorney General to prepare a patent for the King's signature; the warrant, as it is called, is taken back then to what is called The Patent Bill Office; it is still under the Attorney and the Solicitor General, but not in their own private office; a separate office, which is exclusively appropriated to the engrossing of patent bills; it is taken back there, and in the course of a week, or sometimes more, the bill is prepared and signed by the Attorney General or Solicitor, and taken back for the King's signature to it, and it is then called The King's Bill: the King having signed, it goes to the Signet Office, where it passes, and then it is called "The Signet Bill;" from thence it goes to another office, when it undergoes the Privy Seal, then it is called "The Privy Seal Bill;" from the Privy Seal it goes direct to the Lord Chancellor's office and receives the Great Seal: originally it used to pass another stage, which is now dispensed with, it used to go to the Hanaper, to pay the Hanaper fees on it; it is not now taken to the Hanaper Office; but the Lord Chancellor's officer, the clerk of the patents at the Great Seal, receives the Hanaper fees and pays them over; so that it does not now go to the Hanaper Office, and then it receives the Great Seal, if there is no caveat; if there is a caveat, notice is given on it, and if the party says he opposes, then the applicant has no means of getting rid of that caveat but by a petition to the Lord Chancellor; those in modern times are very rare. When I first began to pass patents, they were much more frequent than at this time of day, because at that time they were vexatiously resorted to in many instances, it being considered that the Lord Chancellor had no power to award expenses, however improper the opposition; but about thirty years ago, —approaching to near thirty years, after mooting the question several times before the Lord Chancellor, on a petition I presented, at last the expenses were ordered to be paid by the person who had either not sufficient grounds, or did not appear to support them; in that case the Lord Chancellor did order expenses, and since it has been found that the expenses can be, and are frequently awarded at the Great Seal, the oppositions there are much less fequent than they used to be. When the caveat is removed, or if there is no caveat, it passes the Great Seal, and then it is completed.

That is the whole process?—That is the whole process as regards the English patent.

Now as to the colonies?—It is only a little extra expense as to those, but it does not alter the system at all in any way; it is only an alteration in the prayer of the petition; instead of confining it to England, Wales, and Berwick-upon-Tweed, the petition adds, "and all Your Majesty's colonies and plantations abroad;" in other respects, it is the same process to pass it through the different offices; it is attended with no extra trouble, nor is there any separate document; it is all included in the same, only with those additional words, and it is attended with an additional expense, perhaps six or seven pounds. I generally recommend it to be dispensed with, for I have never yet seen its utility, in very few instances at least have I seen utility, in extending the patent to the colonies.

The Committee have been informed, that when it is advisable to extend a patent to the colonies, if you include one of the colonies that has an independent legislature, it is necessary to obtain the consent of that legislature?—That has never occurred in my practice, and I was not aware of it; it is the first time I heard of such a practice.

Is the mode of taking out a patent for Ireland precisely the same?—Not exactly so; the first step is a similar affidavit and petition to the King; the prayer only praying it for Ireland, instead of England, Wales, and Berwick-upon-Tweed; then it is referred to the Attorney and Solicitor General in Ireland, and it goes to the Lord Lieutenant, the Attorney and Solicitor General, I believe; and I think it goes to the Lord Lieutenant, who refers it to the Attorney and Solicitor General; they make a report, and it comes back here for what is called the King's letter, something similar to the King's warrant on the English patent; that letter goes back to Dublin; then the patent goes through several offices, the *minutiæ* of which I cannot tell the Committee, without I had some documents to refer to.

Are all those formalities requisite for a person who has previously obtained a patent in England?—Certainly; and a similar process is adopted to obtain a Scotch patent. The Scotch patent passes a seal that is called a "Substitution for the Great seal of Scotland," at Edinburgh; and the Irish patent passes the Great Seal at Dublin; the English one, the Great Seal here,—all three separate and distinct jurisdictions; the same expenses incurred; the Irish is rather more than the English, but you may average them all three at about coming pretty near; the Scotch and Irish, taken together, I average at about the amount of the English.

And what is the amount of the English?—There are so many circumstances that vary the amount, it is difficult to speak with any thing like precision; if I was to say upon an English patent with one name only, and not extending to the colonies, including the fee for passing it, I think it is about 110*l.* the solicitor or agent, or whoever passes it, has always, since I have been meddling with patents, more than thirty years,—has always had a fee of ten guineas on passing it; including that, an English patent, with one name, and not referring to the colonies, taking it at a round sum, would be 110*l.*

That makes out the whole expense of the United Kingdom, 240*l.*?—If I am to understand England, Scotland, and Ireland, I should say certainly 330*l.* for the three.

What length of time does it require, before the patent is sealed, for the three kingdoms?—I am to understand by that, the three patents, instead of one patent.

Yes, the three?—The English patent depends so much upon casualties, that you cannot mention the time; they used to be certainly more expeditiously obtained than they are now—certainly considerably more expeditiously obtained than now; sometimes now they are three months or more getting a patent. I have got two going on now, where, unless I get them to-day from the Secretary of State's, they have remained, I think, nearly a month waiting the King's signature to the warrant.

So that in England, a patent may be three months?—Under some circumstances it has been certainly got often considerably below that period, a month or five weeks have been sufficient to get a patent in; but it is rarely, in modern times, you get it in twice that time.

And for an Irish patent, how long?—There it is longer;

how to account for it I do not know, but you can seldom get an Irish patent in less than five or six months; it is the more unaccountable, by reason that the royal signature is only required once for an Irish patent, they have it twice for an English patent, and it is only required once for a Scotch patent, and I cannot account for the great delay; and I have often, and every body who has had any thing to do with it have felt the great inconvenience they are put to in getting a patent for Ireland, so much so, that I have often remonstrated, and had to press it on; I have frequently said, the patent is in danger of having the Irish patentee's right destroyed, inasmuch as he must specify in England, and anybody may see that specification here on paying the office fees for search, and by sending over to Ireland the whole subject-matter of it, there is no patent right to prevent it being used there, and being used is completely destructive of the patent, if the patent has before that time passed the Great Seal.

Cannot he enter a caveat in Ireland?—That is only preventative of any other person taking out a patent right; it does not prevent a person using the thing if he can find what it is, it only prevents him getting a patent for it. I have often had occasion to remonstrate from the danger that was likely to arise from that delay, and I have pressed it in every way I could, but I could never get a patent in less than five or six months there.

That is generally taken into consideration in the time given in the specification?—Yes it is; there are six months given when you state it, but I doubt whether generally speaking, you can ever get it in six months. I have often been much more than that.

That is to say, you doubt very much whether you could get an Irish patent within the time which is allowed for it?—Yes, within the time which is allowed for it; it sometimes happens that a patentee wishes to have the opportunity of trying his invention under his English patent a little, to see how it will work in practice, for it is a dangerous thing for him to try it if it is any thing that is to operate on a large scale; he cannot try it without disclosing it; the consequence is, he says, "I will wait until I have got my English patent that I may try it, so as to see all the bearings before I apply for an Irish patent; if he takes a month or six weeks, it is a moral certainty then he cannot get his Irish patent through before he must specify here.

Did you ever know any instance of any inconvenience?—No, sir, I have not known any instance, but I have often had a great suspicion that by the applications that are made and watching the expiration for the time to specify to get the earliest possible information of patents, and in more than one almost watching it with such scrupulous exactitude, that it struck me there was some motive for it beyond the mere general information that is sought for upon these occasions.

You say there is a great delay in it; do you know in what particular office this delay arises?—I do not know what office.

Do not you know when it passes out of the Privy Seal office or the various offices which you have described; do you not know when it is forwarded from one office to the other?—Not in Ireland.

In England?—Yes.

You can tell where the delay generally arises possibly?—The greatest delay is, when from any cause or other the royal signature cannot be obtained; in some instances where the great officers of state are in the country, then a patentee is put to an increased expense, or he will have to wait a month or two perhaps for the privy seal, unless he will pay an extra expense towards a journey; and upon some occasions patentees have actually paid considerable sums to make a journey on purpose where particular circumstances rendered it necessary that they should have the patent immediately, without waiting until any body else contributed towards the expense of the journey.

Several of these offices are merely formal; there is no act done except a signature; there is no impediment even thrown in the way of a patent?—There is no impediment passing the Signet or Privy Seal office.

Where does it go to after it has got out of the Attorney General's hands?—It goes back to the King for the King's warrant; then the Attorney General prepares a bill for the King's signature which is called the King's Bill; after that is signed, the King's signature is not wanted any more.

In some of these offices is the operation merely formal, and there would be no mischief done if it was entirely passed over?—In a Scotch patent there is a much more expeditious method. I can get a patent although I have to correspond with my agent in Edinburgh; I can get a patent there much more expeditiously than I can in England; in ordinary cases about half the time.

What is the cause of that?—Because it passes by what they call warrant; that is, the King's signature is only had once; as soon as the Lord Advocate of Scotland has made his report similar to the Attorney General's report in England, the King issues a warrant, as it is called, which is a substitution for the King's bill here; it differs a little in form.

Would there be any mischief in having the Scotch form introduced?—I should think it would be a very great improvement.

Is there any practical objection?—I am not aware of any practical objection.

You say that when a caveat is entered before the Lord Chancellor, he has the power of awarding costs; has the Attorney or Solicitor General that power?—No; in one way they exercise it; it is a modern plan; in one way they to a certain extent exercise that power, and it arose on a case of my own when Sir Samuel Romilly was Solicitor General. I had obtained his report in favour of the patent, and I had gone back and got the King's warrant, directing the patent to be made out in the intervening time; a person getting by some means knowledge that the patent I was soliciting had been reported on, he came and claimed to be heard on a caveat. I submitted to Sir Samuel Romilly that it was contrary to practice that a party should be heard at that stage, and in addition to that he had put my party to an increased expenditure by not coming at an earlier stage as he ought to have done; that was the first time it was ever admitted of permitting a party to be heard on the bill, as it is called; he then said, " I will let you the opponent in to be heard now; but it is upon this condition," and ever since that, it has been the rule, " that you shall pay the expenses that the other party has hitherto incurred, if I am of opinion that the application ought not to proceed, (and I think it has been subsequently altered to a further condition annexed to it,) and if I am not of opinion that it should be stopped, you shall pay the expenses of this hearing." I believe something of that kind in some modern cases has been done. I am not clear about that, because that has not arisen in my own practice; at all events since that time any person coming in the second stage before the Attorney General on the bill, he is now made to deposit. Some of them, finding the Attorney General had no judicial power to enforce the payment, refused to pay after they had been suffered to be heard. Well then another remedy was adopted, " you shall deposit so much money, and thus it stands now."

You mentioned the expense of a patent; you mentioned a patent having one name; is the expense increased if the patent is taken out by several persons?—Yes.

In what proportion, can you tell the Committee?—I should think, in the Attorney General's office, it is very little; the Secretary of State's office in each stage there, it is 1*l*. 7*s*. 6*d*. extra, in each stage through the Secretary of State's office. I think there is some extra expense at the Hanaper; there is there an extra expense of 2*s*. 6*d*. or something like that in the Attorney General's office, but there is a very large expense extra at the Signet and Privy Seal offices, for the addition of a name; I have selected those in anticipation, that, that would be enquired of me; I have extracted charges there, as I thought I should not be able to make myself so well understood by words as by putting it on paper, the difference of expense in respect of one name and of two; the expense on one name at the Signet office is 4*l.* 7*s.*: on two it is 10*l.* 5*s.* 6*d.*; at the Privy Seal office it is 4*l.* 2*s*,: on two names it is 10*l.* 0*s.* 6*d.*; so that the addition at those two offices may be considered instead of 8*l.* 9*s.* is about 20*l.* 0*s.* 6*d.*

Is the expense increased before the Great Seal—the Chancellor?—I mentioned before it is 2*l.* something: an extra fee at the Hanaper, but I believe in no other respect; which is received by the patent clerk at the Great Seal office.

Sometimes the petition is referred to the Solicitor, and sometimes to the Attorney General, is it not?—They do not make any distinction at the Secretary of State's office; it is referred generally to the Attorney or Solicitor General; then the applicant, the person passing the patent, takes it to which he pleases, where he thinks he is likely to get the earliest report.

That it is entirely at the option of the applicant?—Quite so.

The fees are the same in both offices?—Precisely.

Is it possible so to word the title of a patent as to escape the caveat?—There have been instances, and one arose in my own practice, where patents have been framed with what they call "Blind titles," for the purpose of escaping the caveats; originally, I should observe, caveats were not permitted to be inspected, and I must say, I think it is exposing patents to great danger to permit them to be inspected; they are at this time of day, originally they were not pemitted to be inspected; now since they have been inspected, it was a very common thing for a man, possessed of a little ingenuity, to frame his title so as to steer clear of some particular caveat, or of all of them if he could. An instance of that kind came to my knowledge; I was concerned in it, where this *blind title* escaped a caveat, and I afterwards got information of it, and stopped it at the Great Seal; and from that time there was a fresh rule laid down.

Do you remember what the title was?—I am not sure I remember right what it was; but it was a very common thing then to frame titles as obscurely as possible, for the purpose of evading caveats: the Attorney and Solicitor General's clerks (who are not men of science generally, who have no mechanical knowledge); the title is worded so obscurely that he could not tell which of the caveats was effected by it, and many caveats have not had the proper notice they otherwise would have had if there had been a specific title referable to the object for which the patent was to be granted. I think the one referred to was an application for some improvement in the process of refining sugars, and a blind or obscure term was made use of; "Process for improving the quality produced from certain vegetable substances;" now it was so obscure, that my caveat that was entered to stop any process in the clarifying sugar, it did not occur to the Attorney General's clerk sugar was a vegetable substance; I afterwards got notice of it, and stopped it at the Great Seal; on that occasion some directions were given by the Lord Chancellor that something specific—some definite object should be stated in intelligible terms in the title for which the patent was applied for; in the title of the invention something specific and definite, not in those general vague and ambiguous terms as the one I am speaking of was couched in,

Does an obscure title vitiate a patent?—I believe not; I am not aware that it has ever been raised; if the specification is obscure that is said to be a ground for voiding the patent,

Or if the specification does not agree with the title of the patent?—Certainly, that is quite clear; there is no doubt about that.

Do you conceive patentees are commonly ready with their specifications within the time allowed for making the specifications?—No, I have generally found them coming at a few days before the time expired for specifying; I have generally found them unprepared until nearly the time was expired, and they are generally got up in great haste at the end of the time.

To what is that owing do you imagine?—In many cases where a man has got it in his mind, and he has not got the practical part when he applies for his patent, and he is afraid to try it, lest he should disclose his process; he has got something in his mind which he has not matured, and when he has got his patent he finds his practice differs a little from his theory, and he has got to reconcile difficulties to mature his object before he can venture to specifiy. That very often happens.

Then would it be any convenience that you should give him more time than is usually given for specification?—I think six months is quite sufficient if they would set about it directly they have got their patents. I think six months is abundantly sufficient, except as referable to Ireland; you cannot always depend on getting a patent within six months there; and it is open to the inconvenience I before adverted to, that if the Irish patent has not been got through when the person is obliged to specify here, any body could get a sight of it and could communicate information there, which is descriptive of the patent there.

You have mentioned sometimes three months occur between applying for a patent, and obtaining the Great Seal to it?—Yes.

During the whole of that time the inventor is liable to lose his patent, supposing any body, by becoming acquainted with the invention, makes it public?—Certainly; and he is exposed to more danger because it is known, upon the notice being given from the Attorney General's office, to all persons who have got caveats on the subject, it is known he is applying that process, he has greater danger. I was taking out a patent for a man, a few years ago, who, on a Saturday afternoon, while his patent was in progress, after his workmen had left for the day, one of them came back; he was going into the workshop, he said what brought you back? oh! says he, there is one of Mr. So-and-so's workmen, says his master has heard you are about taking a patent, and he has come for me to tell him what it is, and I was going to show him what it was; and that often happens, the secret is endeavoured to be obtained when they know a man, who has a number of workmen, inquiries are made about their master applying for a patent.

Would it not be very desirable, if any means could be devised by which the applicant for a patent should be protected from the moment he makes his application?—I think it would; highly desirable; pending the progress of the patent, if I understand the question right, if it was not known before any disclosure that took place, then not by his own act; but if any body surreptitiously gets possession of it, that shall not be destructive of his patent right, unless it was by some means where it had been used before the application, but not pending it; for it frequently does happen that inquiries are made, and, from some instances where the applicant has been stopped, where I have been concerned, I am afraid information has been obtained during the progress of the patent as soon as notice has been sent upon the caveat.

Do people generally begin to sue out their patents in Ireland, and in England, or do they wait?—They should do it.

What is the practice?—Some do begin directly, but generally speaking they do not begin directly; a man says I want to get my English patent, that I may try my experiment without the danger of disclosure.

Do you propose to secure to a man property in his invention from the time he applies for his patent?—I think it is proper it should be so, provided he ultimately gets the patent, and does not rest on that security, for the great difficulty would be if it was not guarded against in some way, a man would keep his application pending six, nine or twelve months to an unnecessary period.

You mean there should be some further advantage in obtaining the patent, otherwise many would have no object than in obtaining, merely obtaining it?—I am afraid I have not made myself understood; there are many men, who would make the application for a patent, would extend it to an inconvenient length of time, while he was protected, and perhaps afterwards not even go on with his patent; he must not delay it, I should think it would be very inconvenient if he was not to prosecute with what is called due diligence, to go on without losing any time but what is unavoidable.

You have been explaining considerable inconvenience, and very often injury occurs from the insecurity of an invention after an application is made?—Yes; and I think it would be proper to protect him pending the application, provided he did not unnecessarily protract it in its progress.

In order to effect that object, it would be necessary to give the inventor a property in his invention?—Yes, it would.

How would you accomplish that object without making it necessary that he should specify at the time of his application?—There would be some difficulty, certainly, in doing that. I do not know how it could be restrained if he disclosed it; but, perhaps, the only way that he could be protected would be, that any disclosure of it, pending the application should not void his patent, although his patent was dated after the disclosure. The law at this day is, if the thing has been publicly used before the date of the patent, although after the petition first presented, that destroys the patent.

As to the practice, how would you secure to a man that which he does not strictly define?—I should say, just the same way as you do now under a patent; you secure a man to-day that which he does not define for six months time to come; but when he does define it, it goes back to the time of the date of his patent, as if he had then defined it. The King grants a patent to-day: the patentee has six months to specify in; he is protected in that intervening space of time, when, at the expiration of six months he puts in his specification, he is in the same situation as if he put in his specification at the time it is sealed.

Might not the man under those circumstances make an application without specifying, and in the interval between his application and the issuing his patent, in which the specification was to be contained, might he not hear of some extension or improvement upon it by some one else, for which that other person had applied, and that he might include in his specification?—I can only answer that by saying, the law has been laid down, that if a man discovers any improvement in the intervening space of time between the granting the patent and the specifying, there is a modern decision on the subject, that he is at liberty to include that, for it is the result of his experiments to mature his invention.

It is not an improvement by the inventor himself, but an improvement by some one else who had brought a better invention?—Then the law would be as it is now. I, who take my patent for one thing, I am secured in it; any other person who has found out something being an improvement upon it, he is entitled to an exclusive right of that improvement if he could use it without my invention; but not to incorporate and to amalgamate mine with his without my permission; that is the law as it stands at this time.

In cases, then, where property is given in an invention before specification, would it not be likely to occur that a person obtaining that property, would have it in his power to include in his specification that more efficient invention, with the same object which might be produced by another person during the interval?—He might do it, but it would be at his own risk of destroying his patent if the thing was discovered.

For the sake of guarding against that inconvenience, would you think it desirable that a person applying for a patent, should at the same time give in a sealed description of it, to which reference might be made hereafter?—I should think that that would be a very desirable way, if it were practicable, but then it would come round to this, that many men would say, "My invention is of that large and extensive nature, that I cannot make such a specification by anticipation as it were, until I have had the opportunity of trying it, as would disclose all its properties; and if I am to be bound by that, perhaps it may be only half the object that I am entitled to, it may embrace but half the object I am entitled to."

Would not that amount to the same thing as compelling the applicant to inrol his specification at the time of his application?—I have thought a great deal about it, but I could not arrive at the conclusion that it would be beneficial, on the whole, to make the man inrol his specification immediately he applied for his patent, or immediately he got it.

Do you think that it would be possible for the applicant to inrol as proposed, a description of his invention, although it might not be possible to draw out a legal specification at the time?—If it is to be of any utility, it ought to be a specification; if a man is left to enlarge it, or contract it, it is open to all the mischief you are attempting to guard against; it ought to be perfect, or it is of no utility.

Might not a person describe some principle or other from which his invention afterwards might be fairly inferred to have arisen?—To give some outline of it, but not embracing the means, the Committee mean.

Yes?—I do not see why he should not be called on to state it more specifically in his title, if he is not to disclose his process, but then the title would be very long in many instances; in France, they are obliged to deliver a pecification at the date of the patent. I do not see how the deposit of the principle of his invention, or the outlines of it, affords him any protection, it is rather, I should submit, a protection to others that he shall not embrace any thing under his patent that he had not really invented.

Do you conceive any improvement might be made with respect to the caveat at present; when a caveat is entered, that the invention was referred to a commission of scientific men, instead of being referred to the Attorney or Solicitor General, to determine between the two applicants; would that be a more satisfactory mode?—I should hesitate much in considering that it would.

Why?—I think it would be attended with great danger to patentees; I think it would be productive of favouritism.

The Attorney and Solicitor Generals not being usually scientific men, does not great difficulty arise, at times of caveats being opposed, in informing them of the real nature of the invention?—Sometimes those difficulties do arise, and I have known them call for scientific information for their own guiddance; I remember Sir Thomas Plumer did that, and some others; I remember Sir Thomas Plumer in particular, he called for some information from a scientific man conversant with the subject, and I think it has been done in other cases; he would call in an indifferent person. In short, the subject of patents is so pregnant with difficulties, that you are choosing among difficulties.

Might not the information given by the Attorney General to any persons called in upon the opposing of the caveat, be construed to be a publication of the patent?—I think not; and the Attorney General would have no difficulty in framing his question so that the person to whom he was addressing it, should not get the precise information of the object to which it was referrible.

Have you any doubt it would be desirable that the Attorney General should have assessors composed of scientific men to assist him in judging?—He has the means of doing that now; if he is at a loss on any subject, he can get information.

What means has he of paying for that?—I do not know whether he pays them at all.

But if you gave him authority to do it and power to pay such persons for their trouble, would not that be a more satisfactory mode?—I certainly should prefer that to a standing board, as far as my humble opinion goes.

What do you think of the propriety of appointing assessors to judge, or commissioners to judge of the sufficiency of the description contained in the specification?—I am not quite prepared, and I should not like to speculate on a thing with which I am not sufficiently acquainted: I should have some doubts about it.

Would it not add to the security of patents, as it would prevent their being set aside on the ground of insufficient description?—And their opinion to be final and conclusive upon that subject?

That is the view contained in the question?—I should have great hesitation in saying that that would be quite advisable; there is so much difference of opinion on abstruse subjects until it is put to a public test, that I am not quite prepared to say any three men would always draw a right conclusion.

Do you think the public at any time during the whole continuance of the patent ought to have a right to question it on any ground?—It is a hardship on the patentee I know, but I do not see how to remedy that difficulty without letting in a greater; it has been talked of; I have had many inquiries made of me about permitting a man to inrol his specification; the answer I have generally given on that is, if you were to do that he would embrace fifty things when he was only entitled to one, if he was afterwards at liberty to put in a new specification, and then he would only claim that one.

Is it not a very common practice, for the purpose of misleading the public from the real nature of the invention, to multiply the number of modes of effecting that object, without particularly specifying that one upon which the inventor really depends?—That many specifications have been framed very obscurely, and in my opinion with that view certainly, but that is only matter of opinion; I cannot state it.

Would not the referring the specification to a commission, to judge of the description being or not being sufficient, be of advantage to the public, inasmuch as it would prevent that practice just alluded to?—If the Committee would allow me, perhaps I should sooner get at an answer to that question if the Committee would allow me to ask, whether it is to be before or after the specification, is the patentee to go to these three scientific men with his specification before he has put it in, because there would be considerable difficulty in the patentee being restricted; they perhaps might say he has only two or three modes that we think good, you shall not take the other seven; the patentee might say, I consider that I am entitled to ten modes, and I should not like to be restricted to three, or I am entitled to three; I can do it three ways, and I should not like to be restricted to one; before I answer the question I must understand whether the Committee meant it to be previously or subsequently to the inrolment of the specification.

The question contemplated, that sufficient time should be allowed to the party as at present between the application for the patent and the inrolment of the specification; but before the specification is final, and before the patent is sealed, that a commission should examine whether the invention is adequately described in the specification, would not such an examination before a commission insure to the public a complete description of the nature of the invention ?—I should think it would be so; but I am not sufficiently in possession of scientific knowledge to form a correct opinion on that point; there are many other persons more conversant with such matters, who are better able to answer that question; I own I feel difficulty about it.

In a chemical invention, for instance, if the commission was to superintend the process, to see that the chemical preparation can really be prepared by the mode described, would not the appointment of a commission for that purpose have a beneficial effect for the public ?—It is probable that it would; but I am not quite competent to form a satisfactory opinion on it.

Is it not advantageous to the public to know really what the nature of the invention is ?—Certainly.

Then, instead of leaving it to the honour of the patentee to describe clearly what the real nature of the invention is, would it not tend to make that matter more clear to the public if a commission was really to investigate the nature of the invention described in the specification ?—Very considerable difficulty might arise upon it: a patentee might not be satisfied with these gentlemen's decision, and then it would follow perhaps as a consequence, that he is not to have his patent after he has gone to the expense of it; I have seen very great difference of opinion among scientific men.

Have you seen much difference amongst scientific men on the point, whether the invention is or is not adequately described ?—Certainly I have; certainly I have very great.

In making these discoveries, you have frequently found, have you not, that the practice in a great way differs from the anticipated effect derived from small experiments ?—I am satisfied that when a patentee can, without fear of the danger of disclosure, make his experiments upon a much more extended scale than he has thought himself safe in doing while his patent is in progress, I have no question he has frequently improved his object very materially.

But is it not also found, that results which have been anticipated in study, when they come to be put together, are not produced by the machine when put together ?—Yes.

Constantly ?—Yes.

Then the patentee himself can hardly predicate with certainty what will be the result of his own machinery in nice operations ?—I am quite sure that is very often the case.

In chemistry, does not a great deal depend upon manipulations and small details, which, if they were described, it would be utterly impossible for men of science to know if they would produce the result promised; as for instance, in making a dye, might not the boiling for five minutes, or ten minutes, most materially alter the result of the colour ?—I should think that very probable.

If it was prescribed in the patent the dye should be boiled ten minutes, no man of science could say with certainty the colour promised should be so produced, should you not expect that ?—I am not competent to answer that question.

If it could be shown that, from insufficiently describing the time, or of any part of the manipulations, the preparation could not actually be prepared in consequence of such insufficient description, would not the patent be liable to be set aside ?—Certainly.

Is not a patent always as obscurely drawn at present, as the specifier thinks consistent with prudence for the legality of the patent ?—I believe that is done so sometimes ; I have no doubt it is done ; frequently it is an object to say as little of the real merits of the invention as is possible : I have no doubt of it.

Is not the principle upon which the granting of patents is founded, the giving a person monopoly for a limited time, for the purpose of making known to the public the nature of a beneficial invention ?—That is the object certainly.

Then would not any contrivance which should make known to the public what the real nature of the invention is, be more consistent with the object of the patent than the present practice is ?—It might be, if that object was attainable ; but I am not quite prepared to say that there would not be considerable difficulty in it : they are to exercise, I assume, a discretion ; and a patentee might be told that this Board differed from him ; and, unless he put it in some shape that they approved, that he should not have his patent. I am not quite clear that that might not be a very great hardship on the patentee in some cases and upon many subjects; there certainly is difference of opinion upon many new principles, or the modes of reducing them into practice.

But it would not be, in this case, a question, how they should be reduced to practice, but whether the method which the patentee asserts will be adequate to reduce them to practice, is or is not adequately described ?—It might I dare say be, in some cases, beneficial; but I am not prepared to say it would in all.

Supposing the Attorney General was directed to appoint an assessor, subject to challenge from both parties disputing the patent; would you suppose that they might be brought to agree on the appointment of a scientific man ?—The applicant and opponent might be brought to agree on him ?

That is the question ?—Perhaps, in many cases, they might.

In cases where there were double applications for a disputed invention, it is now submitted to the Attorney General. Supposing the Attorney General had the power of appointing an assessor, whose appointment was subject to challenge from either of the parties; would they be likely finally to agree upon some scientific person who he might appoint in most cases ?—I should think they would oftener disagree than agree on who should be the assessor, if the Attorney General had not the power to call in such a person as he thought proper or approved. If they differed as to him, the Attorney General to call in a third.

Supposing the Attorney General appointed a scientific man, and he was objected to, the party would state his reason, and the Attorney General would then appoint some one else, if the reason was good; do you imagine, in such a case as that, they would not be brought to agree to the appointment of a person ? —If the Attorney General has the power of the appointment, if it is to be decided by means of an assessor, I should say it would be better the Attorney General should call in any person he chose.

Are there not very minute details, that occur in many cases, the necessity and full effect of which, can only be appreciated in the particular trade to which they relate ?—Generally speaking, it is so.

Must not any commission that should be appointed, be formed of persons of that particular trade ?—I should think they ought.

Would that be advisable ?—I must say I should doubt the propriety of that, certainly.

Do you conceive, in that instance that has just been mentioned, the decision is likely to be more satisfactorily made by an Attorney General who can know nothing about these trades, or by scientific men who might be selected for their peculiar knowledge of them?—I should say, it does not often happen that there is any difficulty that the Attorney General cannot decide; it is not of very frequent occurrence that he is not capable of arriving at a proper conclusion in deciding it.

Now, take a chemical invention; for a chemical discovery how is an Attorney General, who is not acquainted with chemistry, to ascertain whether the mode proposed is capable of producing the effect stated?—I should say that is one of the exceptions to the rule.

Are not very many patents granted for chemical inventions? —Certainly.

In all those cases the Attorney General is not a competent judge?—If there was an opposition before him he might, and it is more than probable he would find some difficulty; but when he hears what each party has to say; first hearing the applicant, not in the presence of the opponent, then hearing the opponent, not in the presence of the applicant, seeing where the interference, if there is any, arises, he can generally put questions to one and to the other, question upon question, till he can arrive pretty nearly at a correct conclusion.

Do you conceive he ever can come to a satisfactory conclusion, as to whether the mode of producing a chemical result is properly set forth by questions without experiments?—I do not know; I am not speaking of the specification.

The Committee are?—I understood the question to be referable to as applicant and an opponent in the previous stages of granting a patent, and where the Attorney General was to decide between the parties, between one and the other; the Attorney General has nothing to do with the specifications, it is only to decide upon interference or no interference at the commencement.

The question you have been asked by the Committee went to the propriety of appointing a commission to examine the specification, in order to ascertain whether the thing was properly described or not?—I must say, I doubt the practicability of it; the vast matter that must come before them that they connot be competent, any three men, to decide on every thing that must come before them.

Is not your answer founded on the supposition that it should be a permanent and unchangeable commission; if the commission was only appointed *pro re nata*, then would the objection you have last stated be removed?—I can only answer as matter of opinion that I doubt the practicability of it.

Supposing each party was to appoint scientific persons, and that those two persons so appointed were to select a third, and to proceed to an examination in case of a disputed application, what do you conceive would be the effect of that?—As referable to whether it should be decided by the Attorney General or in this way.

Yes, that is the meaning of the question?—It is a difficult thing to answer in all its bearings, as it might perhaps in some few instances be beneficial, but as a general rule I do not think it would.

Do you not think that scheme would produce fraudulent caveats and fraudulent attempts to attack the patent, for the purpose of establishing it afterwards; might not two parties come to an understanding, one with the other, that they should make an objection and be heard upon it before the Attorney General, for the purpose of establishing a patent which might otherwise be bad, and by that means introduce fraud into the system?—The Attorney General's merely reporting in favour of a patent does not conclude the question.

Can you give the Committee any information about the law of patents in France or any part of the Continent?—No, I cannot. I have generally declined having to do with them, but I have understood at the application for a French patent, you must deposit a specification.

Have the goodness to state whether or not instances of opposition for the same patent have been entered for different parties?—There are frequently five or six opponents to an application.

Now does one expense on the part of the inventor suffice for all that?—Yes, certainly.

Do you know several oppositions sometimes arise from one quarter, or not, fictitiously originating from the same party under different names?—I have heard something on the subject in conversation, and I have entertained a suspicion that there has been collusion of that kind practised, but to what extent I do not know; but I certainly have had suspicion there are collusions sometimes entered into, but how often I cannot say, and it has not very frequently come under my consideration; but that I have on some occasions thought there was collusive opposition, certainly.

Can you state how a person who has omitted to lodge a caveat, learns what patents are preparing?—He may get some of the knowledge by searching for caveats, and I believe at the different offices through which it passes, if he inquires he may be informed; if he inquires for any particular subject, I do not believe he would get general information of all that was going on; if for instance I was to inquire at the different offices, "Is any thing going on about the steam engine," I dare say I should be told if there was or was not, and if there was, I think I should not experience much difficulty in obtaining the name of the applicant and the title of his invention.

Arthur Aikin, Esq. called in; and examined.

It has been stated to the Committee that between the first application for a patent and the obtaining the sealing of that patent, a period of six weeks or two months elapses; do you conceive that much inconvenience arises from that delay in obtaining the security which the patent gives to the inventor?—No, I do not think it does; there ought to be a reasonable security that the invention of the patentee should not be liable to be pirated in the intermediate time; but that being secured any other that is reasonable I do not see the slightest objection to at all.

During that time you are aware that the inventor has no security for his invention?—I conceive that when an inventor makes an application for a patent, it should be construed as a willingness on his part to give to the public useful information upon certain conditions; and therefore, that there is an implied obligation on both parts, an obligation on the part of the person soliciting the patent, that he will make a full discovery of his invention; and on the other hand an obligation on the part of the public, that while the patentee is taking the steps necessary to fulfil his part of the obligation, he should not be liable to be fraudulently anticipated.

Would you not think it an improvement in the law, if any means could be devised by which the inventor should be secured from the moment of his making application for the patent?—Certainly I do.

Has any means occurred to you by which that might be accomplished?—I have often talked upon the subject with gentlemen concerned in patents, and I think the safest way would be to put the whole, from the first application for a patent, to its being granted, into the hands of examiners, or by whatever other name they might be called; that is, of persons sworn to secrecy, to examine the petition of the person applying for a patent.

Do you mean that those examiners should have a power to refuse a patent if the invention is not thought worthy of having one?—The power of granting or refusing or of sending back for correction should depend upon the result of an inquiry made by the examiners. If they find that no patent has been granted for the object set forth in the petition, then I conceive that the inventor has an equitable right to his patent.

Then you would not leave it as it is now, upon the responsibility of the patentee himself?—Not entirely. The petitioner must necessarily run the hazard of his patent being set aside in case he has included in it any process already practised; for it cannot be expected that the Attorney General or the examiners should be acquainted with all manufacturing processes or combinations of machinery; but the petitioner, I think, has a right to require that the Attorney General by himself or by others, should examine all patented processes to see that his process does not intrench upon any of them, because if it does you are taking his money apparently for nothing.

Do you think there would be much difficulty in finding persons properly qualified for such an office?—I think not, because the only office to be imposed on them would be, a comparison of the statement in the petition with the inrolled specifications. It would however be necessary to have an analytical index made of the contents of the inrolled specifications in consequence of the want of conformity between the titles of patents and the things put into the specifications.

Then until that inquiry had terminated, you would not have the patent sealed?—Certainly not. The following is a short statement of the proceedings, that I think ought to be made in taking out a patent, due regard being had on one hand to the interest of the public, and on the other hand to that of the patentee. It should commence by a petition addressed to the Attorney General, stating that the petitioner has made an invention likely to be of public utility, (the general nature of the invention should be here rehearsed) and that he wishes to have a patent for such invention; also, that he be allowed time previous to specifying, to make experiments or to set up an apparatus on a working scale, and that while such experiments are going on no one shall be allowed to anticipate him by taking out a patent for the same. This petition should be put by the Attorney General into the hands of examiners, in order to ascertain whether the petitioner's invention has already formed the subject of a patent. If it has not, the prayer of the petitioner shall be granted, and he shall be allowed from three to nine, or perhaps twelve months, for making his experiments; subject, however, to an obligation either of specifying at the end of that time or of forfeiting a certain sum. The petitioner having made his experiments, shall then proceed to specify by delivering in to the examiners a full account of his process with the necessary drawings, declaring that the above is a full and true statement. The examiners shall then call on the petitioner to perform his process before them, comparing the process with the written description of it, and requiring the petitioner to correct his description where defective or erroneous. Such corrected statement shall be certified by the examiners, and shall be handed over to a law officer to put it into the form of a legal specification. Such specification shall then be compared by the examiners with their certified description, and if found correct, shall be inrolled. The specification shall remain sealed till the end of the monopoly granted by the patent, and shall not be opened except by an order of court, in case the validity of the patent comes to be contested. But the patent shall not be set aside for any error in the legal form, error in dates, or clerical mistakes. If the patentee during the first seven years of his term practises any variation from the process or apparatus described in his specification he shall be bound previously to lodge with the examiners, a description of such variation, on pain of the patent being void. These variations shall form part of the patent, and the monopoly of them shall cease with the patent. But the patentee shall be allowed, during the last seven years of his term, to work his patent with any improvements, without being obliged to communicate them to the examiners. It is, I think, quite essential, both to the security of the patentee, and to the eventual benefit of the public after the expiry of the patent, that the experiments which must necessarily, in the first instance, be made upon a small scale for fear of the inventor being fraudulently anticipated in his patent, should afterwards be repeated upon a large scale previous to the patent being granted. There is also another reason why this should take place, namely, that patents are occasionally taken out on speculation, not for the purpose of working them, but merely in order to obstruct the course of improvement in any particular branch of manufacture, and thus to enable the patentee to levy a tax on the real improvers, as being the holder of a patent not only not intended to be worked, but often not capable of being worked to any advantage in the manner set forth in the specification. With regard to fees, I should be inclined to levy a small one on the petition, reserving the principal payment for the inrolment of the specification.

When would you have the fee paid?—On the petition being given in to the Attorney General; and at the same time an obligation should be entered into by the patentee, either to go on with his patent, or else to forfeit a certain sum.

Would it not be better that the first fee should be so considerable as to amount to an obligation?—I think not; I should be rather for the plan of deposit, and allowing that deposit to go towards the fees on the specification. In the first instance I think all you have a right to demand is a fair fee for the trouble given, and an obligation that the patent shall be gone on with, under penalty of a certain forfeiture.

Suppose a man paid a fee of 10*l.* and gave an obligation for a bond to the amount of 20*l.* would it not be the same thing as if he at once paid a fee of 30*l.*?—I think not, because if a man has made his experiments upon a large scale, and they are found to answer, it would then be worth while for monied men to join him, and to enable the petitioner to pay the fee. Many inventions are made by persons by whom a large fee could not be afforded, and a monied man would be more disposed to advance the necessary funds, after it had been ascertained by an experiment performed upon a large scale, that the invention was likely to answer in practice; and even if in the first instance the petitioner had made a conditional agreement with a monied man, still that monied man would be more likely to close with him, if the sum to be paid, although certain to be paid sooner or later, was only to be paid after those experiments were made.

In either case, if he does not proceed with the patent, or if he does proceed with it, according to that principle he must still have to pay the sum for which he had entered into an obligation?—Yes, but I think instead of levying it in the first instance in the form of a large fee, it would be better to take it in the first instance as a small fee and an obligation.

You are aware that the heavier part of the fees is not paid till the patent is sealed?—Certainly; it is in conformity with the present practice that I would reserve the heavier fees to the latter part of the business, either the inrolment of the specification or to the sealing the patent, which I think ought to be the last act.

How would you regulate the time to be allowed between the petition for the patent and the inrolment of it?—It should depend upon the nature of the invention, and the Attorney General must be the judge of that; it might vary from two months or three months to six or nine months in case of particular difficulties.

Who would you make the judge of the length of time to be allowed?—I think the Attorney General should be the judge.

You think that a person applying for a patent should be secured of obtaining the patent from the moment of his application?—I think he should; all that the public have to require from him is perfect honesty in giving in his specification, and that his invention has not been anticipated by any previous patent.

Afterwards you would require from the Attorney General that he should examine the specification?—Yes, either by himself or by examiners; it would be better to do it by examiners.

By whom would you have the examiners appointed?—By the Attorney General.

You talked of a sealed specification, do you mean that the specification should not be open to the public?—I think it ought to be open only in case of a requisition from a court of justice; I do not think it should be open for general inspection till the end of the term.

Is not that the case in France?—It is, I understand, a good deal the case in France.

In that case, what security would the public have that they should not be prosecuting inventions for which a patent has already been obtained?—It would, I think, be very difficult in such case to conciliate the security of the public and of the patentee.

Have you not stated, that on the first application for a patent, the inventor should go before the Attorney General with a petition, before he had made any experiments of any extent?—Yes.

If so, coüld any one wishing to become a patentee, after another had obtained a patent which was sealed up, be misled beyond the moment of his petition to the Attorney General?—No person wishing to take out a patent cauld be misled, but a person might make an invention which had been anticipated, and which would be found to be contained in a sealed patent, and a person might erect apparatus for the purpose of carrying it on, and then be liable to be told that it is guarded by a patent; I am aware that there would be that difficulty.

Must not that be the case in France and Holland?—I suppose so, but I do not know how they get over that difficulty.

How do you propose to obviate that difficulty?—I cannot tell; there are difficulties on both sides. On the one hand, I think there is a great deal of annoyance that the patentee is liable to from fraudulent attempts to come as near his patent as possible, without actually infringing it; and on the other hand, I am fully aware that there is also the objection which has been stated on the part of persons *bona fide* making improvements, and finding, after they have been at the expense of setting up apparatus, that they are prevented from using them by patents already taken out. These are two difficulties which oppose one another, and I do not see how it is possible to get completely clear of both of them.

Do you consider the greater objection to arise from publicity?—I think it does; as soon as ever a patent worth working is known to be public, every one concerned in the same kind of business, instead of making his arrangements with the patentee, rather begins, in the first place, to see how he can get the same advantage as the patentee, without paying anything for license; and this is generally done either by contesting the patent, or, which is not quite so fair a way of doing it, by calling some person in aid to point out how it can be safely infringed.

You first of all propose a petition to the Attorney General; having secured that, and the Attorney General being satisfied, you are then to go on with a train of experiments; are you prepared to say how the patentee is to be secured while he is upon those experiments; do you intend, that having so petitioned, he shall be perfectly secure in law against any thing that might turn up, that any other man had done in consequence of seeing those experiments tried!—Certainly.

Are you aware that at this moment, if any person having an intention to take out a patent goes to a person to try it for him, the person whom he employs in that manner would be prevented by law from having any power to use it for himself?—Yes.

Then the security that you would give would be in the petition rendering it impossible that afterwards any should pirate it?—Yes.

At present, although it is supposed that the caveat is a security, in point of fact, is not a caveat very little better than a public notice to others that you are going to do something which they had better look after themselves?—I do not think a caveat is any real security at all.

Supposing the law were altered in the manner you propose, so that instead of the patents being left open to be decided by a court of justice, they were to be decided by some secret tribunal in the nature of examiners, or a commission; do you think that would be equally satisfactory to the public with the present mode?—My plan only goes to regulate the manner of granting patents; my examiners are not a secret tribunal to decide on the validity of patents, but sworn commissioners to see that the patentee has made a full and true disclosure of his invention in his specification previous to his patent being granted.

You are aware that a patent before it is granted goes through a variety of different offices?—Yes.

Are you aware that it has been stated in different courts of law, that this long course of proceeding is intended to make sure that a person does not take out a patent for an improper invention?—Yes.

Do you conceive that that object is effected by the present law?—I think not; because I do not know that there is such an examination into the nature of the invention in any part of that legal investigation as tends to give the public or the patentee that security to which they are respectively entitled.

Then are the Committee to understand that you consider the practice as differing entirely from theory of the law in that respect?—I do not think that the legal investigation previous to a patent being granted, satisfies the claim either of the public or of the patentee.

Would not a commission such as you describe, inquiring into the merits of a patent, fulfil the original intention of the law? —I think it would; because I should propose that those examiners should merely inquire into the agreement of the statement that the candidate makes of his invention, with the exepriments made in the large way, and personally witnessed or inspected by the examiners.

Can you give the Committee any information as to the manner of preparing specifications; are you aware that specifications are frequently, especially in chemical processes, made imperfect with the view of concealing the process?—Yes, I am certain of it; and it was with the view of preventing the fraud which runs through the whole system of patenting, that I think examiners ought to be appointed to see that the actual produce of the manufacture agrees with the statement given in the specification.

Is it not often impossible in chemical results, to ascertain whether the specification is properly given or not without experiments?—Quite impossible.

Are those specifications not made purposely deceptive because the public get hold of the specification as soon as it is published? —There are two reasons, I apprehend, for concealment in the specification. In the first place, a fraudulent patentee will be very glad to have protection for his invention without giving up the whole of his secret, and the great probability of an invention being pirated is also a motive with many to conceal part of their process, even without any direct fraudulent intention, but only in self defence.

If the specification was concealed, would not that desire be greatly removed?—Certainly it would.

Then you conceive the public would gain as much as the patentee would by a previous examination of the specification by persons properly qualified?—I think the public would; because if you examine those patents that have expired, many of them cannot be worked at all, because the patentees, either from negligence or from fraud, have omitted stating particulars which (although not obvious to a person reading over the specification) would be found to be of great importance in endeavouring to carry the invention into effect.

Have you not found that persons put things into patents that have nothing to do with the original title of the patent?—It is perpetually the case; there ought to be a much closer correspondence between the subject of the specification and the title of it.

If any material circumstance be left out of the specification, would not that invalidate the patent during any period of the fourteen years?—No doubt it would.

Supposing a commission or assessors should be appointed, what are the points to which you think their attention should be directed?—I would not have them responsible for any of the legal language of the specification, because it rarely happens that you can obtain in one person the necessary combination of legal and scientific knowledge. In order that the specification be secure, it is at present necessary that there should be a combination of both. Now the duty I would impose upon the examiners would be only that of seeing that the statement made by the patentee corresponds with the process, as brought into practice; I would then leave to other persons the obligation of putting it into legal form, and then I think in equity the patentee ought to be secured from any risk of his patent being overthrown upon a mere legal technical objection.

Then you would advise that the responsibility of the description being sufficient to enable the public to carry the invention into effect, should rest in future with the examiners, and not with the patentee himself as it does now?—Yes.

Have you at all considered how such a commission could be formed so as to be competent and satisfactory to the public?—I do not suppose there would be any great difficulty in finding persons properly qualified. The general run of patents may be considered as divided into mechanical and chemical patents, and I apprehend there would be no difficulty in getting persons pefectly competent on those subjects to examine the statement given in by the petitioner, and to compare it with the actual machine or process.

You think there could be no difficulty in finding many qualified persons?—None at all.

Do you conceive that it would be an easy thing to constitute a board of that description, which would be free from the jealousies naturally arising in the competition of ingenuity?—I think I have left no room for jealousy, because the only duty I should impose upon those examiners, would be an inquiry whether the written statement made by the patentee agrees with the result of that process as carried on on a large scale.

In case your commission adhered strictly to its duty, and confined itself to the point of fact, there could be no objection to it; but might they not be liable to suspicions of exceeding the powers committed to them?—I think not, because it would hardly allow of any difference of opinion. If any one was desired to compare the written statement of a process, with a process as actually performed, there is hardly any room for a difference of opinion; you read over the description step by step, and see whether the process, as described is actually carried on.

Are you aware that a great number of patents now are set aside in courts of law, on the ground that the description is not sufficient to enable the public to work the invention?—Yes.

Then such a plan as you have proposed would obviate one great source of litigation?—I think it would. There is another thing which I have observed with regard to patent causes, which induces me to recommend that the patentee should not be liable to be thrown aside by mere legal objections, which is this, that in trials on those occasions it not unfrequently happens that neither the jury nor counsel, nor even the judge, understand the subject. The natural tendency therefore in the minds of the judge and counsel is to decide the case before them on a point of law, that being a subject with which they are familiar, rather than on the practical parts of the specification. I have seen this happen so very frequently, that I think it is very desirable that it should be prevented if possible, because it is not doing justice to the patentee, or to any party at all.

Have you considered the propriety of the present rule of law, that a patent cannot be given for a principle?—Yes.

Do you conceive that that could be modified in any way?—I think decidedly that a patent should not be granted for a principle, unless accompanied by a specification of some practical application of it.

Supposing a new principle to be discovered and applied to practice in one efficient mode by the inventor, should he be entitled to a patent protecting the principle, however otherwise applied?—That I think would depend upon the nature and extent of the principle.

Take, for example, the principle of condensing steam in a separate vessel?—I should be inclined to allow Mr. Watt, the inventor, to have a monopoly of it, provided in his specification he had given (which he has not given) all the details of the machinery employed by him at the time of taking out his patent, whereby he carried the principle into practice.

Are you aware of any inconvenience that has arisen from the present rule, that more than five persons cannot be interested in the property of a patent?—No, I have no experience of that.

Does it not frequently occur that a principle though it is not directly applicable to any practical purpose, nevertheless may be made indirectly applicable and very beneficial to the public: for instance, suppose the common principle that the tension of a spring varies as its flexion (which is the foundation of the construction of all chronometers,) suppose that principle to be discovered, do not you think that the discoverer of that principle would be fairly entitled to some payment in the shape of a toll or tax upon the construction of chronometers subsequently?—I think not unless he had brought it into effect, unless he had shown a practical mode of doing it.

May it not frequently occur that an individual of great mathematical science may discover a principle and yet may not possess that mechanical skill that would bring it into practice, and he may therefore let the principle lie by for a great length of time; but if, on the other hand he were to be allowed to derive some compensation from the subsequent application of his principle by other persons, he would be induced to divulge it?—I should be inclined to restrict it rigorously to things actually brought into practice, as long as the principle is a bare mathematical or chemical principle, without any actual application of it I should not give a patent for it.

Take for example the principle of the conical pendulum, which you are aware performs revolutions in equal time, and which has been most extensively applied to the steam engine, do not you think that the discoverer of that principle would be entitled to some compensation from those that subsequently applied it, in the shape of the governor to steam engines?—I think not; I should require the inventor to have applied it practically before he took out a patent for it,

Have you considered whether it would be an advantage to allow parties to take out patents for short periods instead of fourteen years, with a proportionate diminution of expense of fees?—I do not see that it would; because, generally speaking, it would not be agreeable to a patentee; for whenever a patent is taken out it requires some two or three or four years to bring it into actual operation, and if you have a patent only for seven years, the time is expired before you get any thing from it.

(To be continued.)

NOVEL INVENTIONS.

Substitute for Wheaten Flour.

A medical gentleman, named Gouldson, residing near Manchester, has discovered a mode of separating and preparing the farinaceous parts of such bulbous roots as turnips, carrots, parsnips, beet, &c., and of converting it into fine flour. After a great variety of experiments, carried on with perfect success for nearly two years, this gentleman has obtained a patent for his process, which, if his report is in every respect correct, and that he really does produce good and nutritious bread, equal both in quality and colour to the purest white wheaten bread (which is positively asserted) the discovery may be considered to be of incalculable value; for the quantity of farina to be obtained from the roots grown upon any given quantity of ground compared to that produced from the ears of wheat upon a similar space, must be greatly increased, the patentee says, twenty times at least. We hope to be enabled shortly to communicate more satisfactory information on this subject, and to speak from our own observation. It will be six months before the patentee is called upon to communicate his process by enrolling his specification.

Kneading Dough by Machinery.

In large baking establishments the kneading of dough for bread or biscuits, is attended with very great labour, and being performed by the hands and sometimes by the feet of men not particularly attentive to cleanliness, a convenient mechanical substitute for the manual labour of kneading, must in every point of view be desirable.

It is not a little remarkable that at this time there are recently imported from Paris no less than four differently constructed kneading machines, some of which have and the others are expected to become the subjects of Patents in this country.—

Thoe which we are acquainted with certainly possess the merit of simplicity; and one of them which we have seen, and tasted the effects of, promises in our opinion to be a very valuable appendage to the bake-house.

The comparative superiority of one of these machines over the other appears to us obvious, but as none of them are yet fairly before the public, we are compelled to refrain from description, hoping however that the subject will attract public attention, as it will necessarily remove practices, which if generally known, would be universally reprobated.

New Patents Sealed in 1829.

To Francis Westby, of Leicester, in the county of Leicester, cutler, for his having invented certain improved apparatus, to be used for the purpose of whetting or sharpening the edges of the blades of razors, penknives, or other cutting instruments. Sealed 26th Nov.—2 months.

To John Marshall, of Southampton Street, Strand, in the county of Middlesex, tea dealer, for his new invented method of preparing or making an extract from cocoa, which he denominates Marshall's Extract of Cocoa. 10th Dec.—2 months.

To Benjamin Gouldson, of Pendleton, near Manchester, in the county of Lancaster, surgeon, for his having invented or found out certain improvements in the manufacturing of farina and sugar from vegetable productions. 14th Dec.—6 months.

To Charles Derosne, of Leicester Square, in the county of Middlesex, gentleman, in consequence of a communication made to him by a certain foreigner residing abroad, an invention by himself, being in possession of an invention for certain improvements in extracting sugar or syrups from cane juice and other substances containing sugar, and in refining sugar and syrups. 14th Dec.—2 months.

French Patents

GRANTED IN JULY, AUG. AND SEPT. 1829.

To F. Grillet, Mines,for ruled paper and a process to draw in the loom for figured stuffs. 5 years.

— M. S. Silvant, Paris, for an apparatus to give light, he calls " Silvant Lamp." 10 years.

— S. P. Beleurgey, Moirt, for a graduated powder horn. 15 years.

— A. F. Selligue, Paris, for a mechanical kneading trough. 5 years.

— A. Lavaud, Periguenc, for a simultaneous method of teaching to read and write in three months. 10 years.

— Duguit, Paris, for a mechanical kneading trough. 15 years.

— C. Widder, London, for a method of condensing and evaporating liquids. 15 years.

— The Count of Martizure, Paris, for a machine to propel boats up a stream by the force of the current. 10 years.

— T. F. Guivehoa, Lyons, for a method of weaving, calculated to prevent the frauds of dyers. 5 years.

— B. J. Dubost, Lyons, for a method of towing boats by combining steam engines and horses. 15 years

— Lebihan, E. C. Paris, for a compass to draw all kinds of curved lines. 5 years.

— Joarhit, Paris, for a method of impressing cloth by the steam of water. 5 years.

— P. Ferrand, Paris, for a mechanical kneading trough. 5 years.

— E. Lasgoraseix, Paris, for various kneading troughs. 10 years.

— The brothers Trotte' de la Roche, Mars, for a method of pounding and softening hemp for spinning. 5 years.

— Messrs. Goulhier, Strasburg, for a fire engine. 5 years.

— J. F. Lechartier, Dijon, for a mode of painting in oil, called by him, " Chrismatography." 10 years.

— J. Roche, Lyons, for a mechanical boat for internal navigation. 15 years.

— The brothers Guy, Paris, for machines to make bread. 15 years.

— Milan, Jun. Paris, for an hydrostatic lamp on Girard's principle, 5 years.

To Mazel, Son and Co. Toulouse, for a machine to unharness horses, from a carrage and to trig the wheels at the same time. 10 years.

— Brossou, Paris, for a process of rendering poroue stones solid and impenetrable to water. 15 years.

— L. Ribaud and J. Weerly, Lyons, for improvements in the machines called " Jaquarts"

— A. Grillet, Paris, for a way of employing hydrogen gas in the fusion of iron ore. 15 years.

— Vonoveu Jun. Paris, for a doll to try men's clothes on. 5 years.

— E. Felissent, Lyons, for a drying apparatus with the air warmed immediately from the fire. 15 years.

— P. Averty, Paris, for an hydraulically closed water closet. 5 years.

— Darche, Paris, for various economical cooking and heating apparatus. 15 years.

— P. M. Albret, Aix, (Bouches du Rhone,) for a receptacle for unwinding silk in cods. 5 years.

— Bodson and Son, Mézierés, for a method of preparing cleft iron for drawing. 10 years.

— A. C. J. Fournier, Paris, for a bee-hive called by him, " Ruche naturaliforme," (a naturally shaped hive,) 10 years.

— T. Oxnard, Marseilles, for different modes of preparing brown and white sugar from the raw and green sorts. 15 years.

— L. E. Tabarié, Montpellier, for an œnometric method of determining the quantity of Alcohol contained in wines. 10 years.

— E. F. Guerin, Paris, for two hoops to be added to the canvas fire buckets now in use.

— N. Bidremau, Lyons, for a machine to grind and mull plaister, called by him a sifting or perforated mill. 5 years.

— X. Jourdaui, Altkirch, for a loom to weave all kinds of stuffs. 5 years.

— Lahore, Paris, for a system called by him " Lahoridi," for mechanical kneading troughs. 10 years.

— E. F. Vidocq, St. Mand's, near Paris, for Vidocq paper and pasteboard composed of amimal, vegetable, and mineral substances, called by him " Tiles unsusceptable of deterioration from wet or weather." 5 years.

— P. B. Barrow, Paris, for an economical sowing bag, called by him " Barrow's sowing bag. 10 years.

— A. E. B. M. Renaud de Vilback, Montpellier, for a system of iron rail roads. 15 years.

To J. Byrne, Madden Passy, near Paris, for an apparatus to convert stagnant into running water, without raising it above its natural level, and this by means of artificial channels made at the least loss of power possible. 15 years.

— H. Pope, Paris, for a new mechanism and disposition of the chords applicable to different systems of piano-fortes. 10 years.

— M. Daninos, Paris, for the manufacture of men's and women's hats as well as caps (casquettes) in cotton and cloth, of all colours not plaited, to imitate leghorn, also for joining silk stuffs to cloth or cotton. 10 years.

— R. B. Beaudet, St. Maixent, for an expeditious cooling tub calculated for brewers. 5 years.

— P. F. J. Wallestaes, Lisle, for a self elevating bureau or desk. 5 years.

— C. Meissounier, Paris, for a process to extract the colouring matter from dying woods and vegetables by means of steam. 10 years.

— A. Gallé, Paris, for an everlasting hitching chain. 10 years.

— J. A. Letellier, Paris, for an hydraulic machine, called by him an " Hydrodynamic." 10 years.

— Messrs. Guimberteau and G. Lavigne, Paris, for what they call moveable supports with free movements for the axes and axletrees of carriages, to diminish friction and the necessity for grease." 5 years.

— J. Dubois and Co. Paris, for a machine to pick, peel, and whiten pepper. 5 years.

— The brothers Levasseur, Paris, for an improved lamp socket called " socket with a superposed stopper." 10 years.

— The Counts Maudet and Sallier du Piu, Paris, for methods of manufacturing Chinese mother of pearl. 10 years.

— P. L. E. Guilliny, Lyons, for a method of giving a determined length to skeins of silk which become separated on the winders in proportion as the opening proceeds. 10 years.

— L. Lafont, Valence a' Agen, for a clock with irregular works, which he calls " Lafont's Works." 5 years.

— Bronzac, Paris, for an apparatus he calls " chimney with a moveable hearth." 15 years.

— The brothers Burat, Paris, for herniary bandages, with a fixed cushion and a moveable and broken spring. 10 years.

— Gerstner, Vienna, represented by Armonville, Paris, for two kinds of waggons to run on rail ways a little curved. 10 years.

— B. Sensibe, Paris, for carriages with one wheel, called by him " Adeliennes." 15 years.

To L. T. Piver, Paris, for a composition to be used in the bath as well as for washing the hands, called by him "snow white." 5 years.

— P. G. A. Guellemard Gruchet, and R. R. Philippe, Bolbec, for an oven to bake economically bricks, plaster, lime and tiles. 10 years.

— Tainturier jun. Lyons, for a machine to prevent dyers from pilfering silk from the pieces confided to them. 5 years.

— C. A. Raymond, Paris, for a contrivance to open and close peruques at will. 5 years.

— P. F. Toussaint, Paris, for a lock with turn and a half and with a double knob, named by him " Dicinimic." 5 years.

— G. Petzold, Paris, for a square cast iron piano-forte, open on every side and without a back. 10 years.

— P. A. Frichot, Paris, for a process to make sheeting and Mosaic ornaments in artificial mable. 5 years.

— S. Schurenback, Friburg, represented by Marx Colmar, for a way of manufacturing white lead.

— F. Germion, Paris, for a method of figuring very long leathers. 5 years.

— Andrieux, Paris, for a machine called by him a " spreader," calculated for peeling and spreading out hemp and flax. 15 years.

— A. Kaufmann, Paris, for a file to extripate corns from the feet. 5 years.

—Lacoix Salmon, Paris, for improvements in violin instruments. 5 years.

— C. Girondet, Paris, for mechanical presses for type printing. 5 years.

— J. M. Lapeyre, Prénéron, for a moveable distilling apparatus. 5 years.

— P. A. Keyser, Strasburg, for a musical instrument he calls, " Eolion piano-fortes." 5 years.

— J. F. N, Vourlaud, Lyons, for a process to make Cologne water, (Eau de Colonge.) 5 years.

— H. Giraud, Lamure, for an economical way of baking bread by means of three sorts of ovens warmed by pit-coal. 5 years.

— L. J. Acher, Morey, for a machine with only one head to end two ribbons at the same time. 5 years.

— T. Oxnard, Marseilles, for a method of refining brown and white sugar from raw and green. 15 years.

— P. Laroche, Paris, for a cooking apparatus he calls " The Ladies' Kitchen." 5 years.

— E. Ravigneaux, A. Delarothiere, and F. Taviot, Troyes, for a mode of knitting, called " The English." 10 years.

To P. C. Dupont, Troyes, for a loom to make elastic knitting with double meshes. 5 years.

— R. Loche, Bordeaux, for a method of making wine. 5 years.

— X. Pilliot, Paris for an improved lamp socket. 5 years.

— Bottier Armand, Paris, for clogs with a division, three hinges, and Chinese shaped tips, he calls them "Chinese clogs" 5 years.

— S. Lesourd, Clichy la Garenne, near Paris, for an instrument he calls a "Mute cleaver" to cut wood fuel. 5 years.

— T. B. Moudon, Tézénas, and F. Payre, St. Etienne, for the preparation of a matter to be used in silk ribbon weaving. 5 years.

— F. Joubert, Paris, for a method of purifying tallow. 10 years

— J. A. Fonzi, Paris, for an open apparatus for burning coal without smoke or smell. 10 years.

— Messrs. Marret and Cordier, Paris, for frames and household embellishments in metal and of every dimension. 15 years.

— J. P. Praget, Aix (Bouches du Rhône) for a distilling apparatus. 10 years.

— J. Harris, Paris, for improvements in the construction of spheres, applicable to water wheels taking the current from underneath, as well as to the wheels of steam and mechanical vessels, as a nautical propeller. 15 years.

— J. C. Ventrass, Paris, for improvements in the construction of bellows for forges, founderies, and chambers. 15 years.

— Coulaux sen. and Co. Molsheim, for improvements in coffee mills. 10 years.

— O. Pacqueur, Paris, for a new modification of steam engine, and an arrangement of boilers, for refining sugars in general, as well as making them from beet root.

— A. de Boussard, Toulon, for improvements in Gerard's lamp. 10 years.

— J. M. C. Dugurt, Paris, for a method of composing and printing church and other music. 15 years.

— A. M. Velleret, Paris, for a method of rendering the stocks of wheels moveable by the elasticity of the spokes. 10 years.

— A. F. Dearey, Paris, for electric machines either of one or both fluids. 5 years,

— Gouin sen. Paris, for an improved dibble seed bag. 5 years.

— C. L. Petit, Paris, for an instrument he calls "felifer" to thread needles. 5 years.

— E. Lasgorsing, Paris, for sundry mechanical kneading troughs. 10 years.

— O. Lutel, Paris, for applying horse hair to the purposes of clothing. 10 years.

CELESTIAL PHENOMENA, FOR JANUARY, 1830.

D.	H.	M.	S.	
1	14	34	0	☽ in □ first quarter.
2	14	0	0	☽ in conj. with *o* in Pisces.
4	1	0	0	♂ in conj. with κ in Libra.
5	0	0	0	Clock before the ☉ 5 *m* 41 Sec.
5	8	0	0	☽ in conj. with γ in Taurus.
5	10	0	0	☽ in conj. with 1 δ in Taurus
5	10	0	0	☽ in conj. with 2 δ in Taurus
5	15	0	0	☽ in conj. with α in Taurus
8	5	0	0	♂ in conj. with λ in Libra.
8	5	32	0	Ecliptic opposition, or ● full moon.
10	0	0	0	Clock before the ☉ 7 *m* 49 Sec.
11	1	0	0	☾ in conj. with ξ in Leo.
12	12	0	0	☿ in conj. with 1. 2 β in Scor.
13	6	0	0	☿ in conj. with ♅ Long. 5° in Capri.
				☿ Lat. 1° 56' S. ♅ Lat. 35' S. Diff. of Lat. 1. 21
18	12	0	0	☾ in conj. with τ in Leo.
14	0	0	0	☾ in conj. with β in Virgo.
14	1	0	0	♀ in conj. with γ in Aqua.
14	15	0	0	☾ in conj. with η in Virgo.
14	22	0	0	♂ in conj. with ν in Scorp.
15	0	0	0	Clock before the ☉ 9 *m* 43 Sec.
15	18	0	0	☾ in conj. with ϑ in Virgo.
16	16	3	0	☾ in □ last quarter.
16	17	0	0	☿ in conj. with ϑ in Capri.
17	3	0	0	☾ in conj. with κ in Virgo.
18	20	0	0	☾ in conj. with γ in Libra.
19	22	0	0	☾ in conj. with φ in Oph.
19	23	41	0	☉ enters Aquarius.
20	0	0	0	Clock before the ☉ 11 *m* 21 Sec.
24	4	54	0	Eclipt. conj. or ● new moon
21	0	0	0	Clock before the ☉ 12 *m* 40 Sec.
26	1	0	0	☽ in conj. with ϑ in Aqua.
30	0	0	0	Clock before the ☉ 13 *m* 39 Sec.

☽ the waxing moon.—☾ the waning moon

Rotherhithe. J. LEWTHWAITE.

NOTICE TO SUBSCRIBERS.

Our anxiety to place before our readers as early as possible the whole of the Evidence taken in the House of Commons, on the Laws of Patents, has necessarily contracted the space which should have been occupied in reporting Patents, and also compelled us to neglect the favours of several Correspondents; we shall however endeavour, in our next, to appropriate greater space to these subjects.

THE
London
JOURNAL OF ARTS AND SCIENCES.

No. XXIII.

[SECOND SERIES.]

Original Communications.

ART. VI.—ON THE REPORT OF THE PATENT-LAW COMMITTEE.

To the Editors of the London Journal of Arts, &c.

GENTLEMEN,—I have perused the mass of evidence elicited and published by this Committee of Enquiry with an attention proportioned to the deep interest I feel in the subject of their labours. The importance and extent of the information derived from the witnesses, and the documents presented—form ample claims for the mature deliberation of Parliament, and for the most decided and early amelioration of a system, every portion of which is now publicly proved to be utterly incompatible with the interests of a manufacturing and commercial state, completely at variance with the common policy of any government, and totally contrary to the established rules of protection to individual rights and property. Whatever terms—from experience of the extended evil of this system—I have used in describing its multiplied and various anomalies, extravagancies, and impositions, those terms are borne out to the very letter by the evidence, separate and united, of a number of respectable individuals, in various stations and occupations, who, however they differ upon some main features of remedy, have universally shewn and acknowledged the extent of the evil, and the necessity of its immediate and efficient correction.

To attempt the classification of the innumerable facts stated in the report and connected documents, under their proper heads of injurious operation, would indeed be an Herculean task, the exemplification would probably occupy the whole of your Journal for two years to come,—long before which period I trust this complicated system of wrong will be shaken to its foundation, and its ruins form a mere historic notice. The Report itself should be read by every man engaged in the prosecution of discoveries, and the advancement of the arts.

But there are some matters brought to light of such peculiar and antic * extravagancy, that I may be allowed your editorial licence to perform their requiem before they are consigned to the " tomb of the Capulets." We will refer to the several stages of the Petition, and subsequent documents, as described by Mr. Abbott, a gentleman in the Petty Bag Office (Report, p. 47, et seq.) Mr. Attorney General's classic production, called the " Bill," changes its cognomen, for the purpose of shewing its activity in collecting the fees, as fantastically as Harlequin does his dress. It is " Mr. Attorney General's Bill," as the proper father—then " The King's Bill," by adoption—then the " Signet Bill," by grace—then the " Privy Seal Bill," without grace; but now comes the legerdemain par excellence; it is not converted into " My Lord Chancellor's Bill," yet the fees to the old Hanaper and to Mr. Deputy Hanaper, its trusty custos, are converted out of the patentee's pocket to the amount of 8*l.* 4*s.*, although there is not a single official act done, no, not even a scratch of the pen for the extravagant charge; nor does Mr. Deputy even make his appearance on behalf of himself and the "Hanaper." How then is the business managed? Mr. Abbott explains it. He says (p. 49), "The Bill originally used to pass another stage, which is now dispensed with; it used to go to the Hanaper—to pay the Hanaper fees on it," (an important public object, no doubt); "it is not now taken to the Hanaper Office." The reader's unmystified intellect will naturally draw the inference, that as the Bill was formerly taken to the Hanaper to pay the Hanaper fees on it, and that as this stage of the business is now dispensed with, the fees are necessarily dispensed with. A conclusion from sound premises may be very logical where *fees* do not form the corollary; e. g. "but the Lord Chancellor's officer, the Clerk of the Patents at the Great Seal, receives the Hanaper fees, and pays them over." So that even the formal ceremonial of the old Hanaper's state is dispensed with, the majesty of the Great Seal is proved by its own officers to consist in receiving fees, and the intellect and labour of the community are to be taxed for keeping up this pretty farce!! If this be not unblushing charlatanism, I do not know what is. I believe that upon further investigation the whole family of "State and Chancery Recipes" will be found as unessential to the actual security of an invention, and the ordinary business of life, as is this admirable instance of additional protection given to a patent by its *not* passing to the Hanaper, in order to pay the Hanaper fees.

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* Query?—" antique"—possibly Vindicator uses the terms as synonymous.—Ed.

An extension of the patent to the colonies "is attended with no extra trouble, nor is there any separate document," only an addition to the prayer of the petition of the words, "and all your Majesty's plantations and colonies abroad." For this heavy duty, the copying of eight words—nearly 6*l*. are charged at the Secretary of State's and other offices!!!

The courtly minuet dances performed by the petition, warrants, report, &c. for an Irish patent, between London and

Dublin, occupying with their eccentric fantasias nearly six months (even sometimes twelve months), "to the imminent danger and in some instances the utter destruction of the Irish patentee's right," are strongly and correctly described by Mr. Abbott. He says, (p. 51) with the proper feelings of a man intent upon the interests of his employers, "I have often had occasion to remonstrate on the danger likely to arise from that delay, and I have pressed it in every way I could, but I could never get a patent (Irish) in less than five or six months there."

Now what is the real occasion of this delay? The retention and performance of unessential frivolities, for the purpose of keeping up the payment of the fees. As I have before observed, fantastic operations, and the consequent claim for fees, are interwoven with and integral to the principle of issuing patents. For the fullest proof of this assertion, I will refer the reader to the titles and charges of the several officers and things officially concerned in, or presumed to be essential to, the issue of patents, as exhibited in the three schedules of charges for English, Scotch, and Irish patents, as delivered in by Mr. M. Poole, of the Attorney General's Bill Office (vide p. 87, 88). In each case there are petitions, references, warrants, and reports. What service the references, warrants, and reports are, except for the gathering in of fees, the manly evidence of Mr. W. Newton will shew. He says, "Mr. Attorney General reports that he has examined this subject, (upon petition) and thinks it will be for the benefit of the country that the King should grant the patent, whereas we all know that the Attorney General is otherwise occupied, and that he is not at all acquainted with any more than the petition." If this view be correct, what other purpose do these reports, references, and the warrants directing them to be made, serve—than to swell the amount of oppressive charges upon inventors. But they are integral to the "State" of the great and little, and private-public,—and public-private, and substituted, and non-substituted Seals. So long as this useless parade of seals and warrants is conceded as being essential to the security of an invention—so long must the fees be provided for the officers employed. Reverse the proposition and say, the *fees* shall not be paid—enact that *they* are not necessary for the security of an invention—the most zealous advocates of the system will become sainted converts to the position I advocate—the utter inutility as respects the public, of subjecting inventors to all these "State-nothings." Abolish all the fees to the "things," and it will be soon found that the ordinary concerns of life may be very well conducted without their agency.

It may be asked what official document I would substitute for a patent, for the security of inventors, and to what forms the claimant of such security must be subjected. Previous to stating my views upon this important bearing of the subject, I would request attention to a few preliminary positions, and the reader's fair unbiassed consideration of them before he rejects the substitute I propose. I have demonstrated in a former letter, that the principle of the law of England acknowledges that there is an inherent property in intellectual labor, independent of, and distinct from the organized matter or form in which it may be exhibited; and that when such labour and skill are actually embodied, the law considers every such production as a property entitled to its protection. I had not then seen the excellent declaration which precedes the enactment of the French patent laws—(Report App. D.), it would form a beautiful model for a preamble to the act which we trust will ameliorate our system. The French declaration asserts and announces the broad principles upon which alone, (in my humble judgment), any amendment can be effected in our patent laws, that shall combine the true interests of the public with the just rights and reasonable claims of inventors. After the opening forms, it runs thus, "Considering that every new idea, the manifestation or development of which may become useful to society, belongs originally to him who has conceived it, and that it would be to attack the rights of man in their essence not to regard a discovery in industry, (i. e. in useful arts and manufactures) as the property of its author; considering at the same time, how much the want of a positive and authentic declaration of this truth may have contributed hitherto to discourage French industry, by occasioning the emigration of many distinguished artists, and by causing a great number of new inventions, from which this empire ought to have drawn the first advantages, to pass to foreign countries,—considering in short, that all the principles of justice, of public order, and of national interest, require imperatively that for the future the opinion of French citizens respecting this species of property should be fixed by a law, which shall protect and render it sacred,—It is deecred as follows;"—&c.

Here are *principles* of legislation announced—sound, broad, efficient, all-pervading principles that excite the warm sympathies of the benevolent mind—that flash upon the understanding with joyous conviction—that captivate the imagination with a beau-ideal of elevation and dignity and benignity in Government—and that lead the people to cordial, cheerful, and something like filial obedience to institutions framed for their real protection, and evident advantage; principles of legislation that triumphantly assert and support the rights of man, and firmly establish justice, public order, and national interests. Would to God that governments could see generally that it is only upon such principles that men ought to be governed—that upon such principles authority and obedience form an indissoluble compact. All the "Whereases" of the thousands of British acts of Parliament which have passed since the Bill of Rights, do not contain one thousandth part of the cheering announcement which adorns this preamble; it should be placed in letters of solid gold in both our Houses for their future guidance in legislation. I hope I may be excused for offering this hint—from every appearance of the times, it may become very serviceable.

Now let any rational and unbiassed man determine with himself, whether the principles announced in the preamble of the French law of patents, should or should not be the guides for the legislative amendment of our own. I think every such man must acknowledge, that those principles should *alone* form the basis of our enactments for the security of inventions. If so, the entire system of patents under the seals, with its offices, proceedings, antiquated claims, heavy fees, and useless formalities, cannot form the basis of a real protection to inventive talent, because it is a system of exclusion to all who cannot afford the fees, and pay the expenses of the numerous forms—always considering those fees and formalities essential and integral to the issue of patents under the seals. *The rights of poor inventors cannot be protected by any modification of the present laws of patents.*

Patents and the formalities of obtaining them are suitable to state occasions only; the fees and the duties performed or unperformed, do not in those instances affect the gaining of subsistence or property by labour and ingenuity. But patents under the seals, are in their very nature and constitution unfit for the ordinary purposes of commercial pursuits; discoveries and inventions must be considered in the present state of the world as commercial pursuits. *Protection to property in inventions, therefore, should be given by a single document in the simplest form, and procurable with the least possible delay, trouble and expense.* This course will alone equally protect and render sacred the property of the poor as well as the rich. It could never have been contemplated by the framers of the act of monopoly in 1623, that patents for inventions would become a source of extravagant emolument to the Crown and Chancery officers; or that the forms, questions, and decisions relating to patent property in inventions, should in time generally affect the most important manufacturing and commercial interests of this vast Empire.

Mr. Wyatt states that only one or two patents were obtained in the time of King James. (Report p. 103.) In the Appendix B. p. 210, there is an account of all the patents for inventions granted in England, from the time of King Charles 2d. In ten years, from 1675 to 1684, forty-seven patents were issued; average under five per annum. In four years of James 2d. eighteen patents; average four and half. In William and Mary 1689 to 1701, thirteen years, one hundred and five patents; average eight. It is observable that during three years in the beginning of their reign, the annual issue averagestwenty; during the last three years of William, only three: the cause of such a great decline may be worth ascertaining. The first year of Queen Anne and also her ninth absolutely left the great Hanaper, its Officers, and those of the state without a single invention-patent fee; poor gentlemen, they must have been absolutely starving, if the state had not otherwise provided for them. Two other years of Anne only produced one patented invention each, and the average of her twelve years was but two per annum, 26 patents only being issued; whether she discouraged all *art and invention*, or whether the lawyers discountenanced it—"Othello's occupation was gone;" the great and little seals were not then in request for the protection of industry. Their officers would have forgotten their calling, and the old Hanaper would have rotted, for want of fees to repair it, had it not been for a few elevations of Commoners to the peerage, and political grants of crown lands to favorites. During thirteen years of George 1st, from 1714 to 1726, ninety one patents were sealed; average seven. In the reign of George the 2d, from 1727 to 1759, a period of thirty three years, two hundred and fifty four patents; average seven and a half. I will divide the long reign of his late Majesty into three periods, for the purpose of showing the progression of applications for patents.—

1760 to 1779 .. 20 years 488 patents; average 24½ per ann.
1780 to 1799 .. 20 —— 1118 —— —— 56 ——
1800 to 1819 .. 20 —— 2038 —— —— 102 ——
During the present reign.
1820 to 1828 .. 8 —— 1318 —— —— 146 ——

From a careful perusal of the above calculation, it is evident that at the rate of about 70*l.* per English patent which is received by the several officers in charges and fees, regular and extra, (independent of the stamp duties and agents' charges,) an enormously increasing tax is levied upon inventors in support of a system which is totally inapplicable to their occasions, and most onerous in its formalities. The Irish and Scotch patents issued, are about thirty-four per annum, made up precisely of the same absurd duties, no-duties, extravagant charges, and antiquated pretensions. In the Scotch "*substitution*" for the Great Seal, besides the warrants, reference, and report amounting to 20*l.* there are M.M. the director, 15*l.* clerk, 7*l.* 10*s.* translator, another director, servant, livery-and-lace, and extras in my Lord Advocate's department, altogether 25*l.* 0*s.* 7½*d.*; then the Great Seal's "substitute," my Lord keeper 6*l.* 13*s.* 4*d.*; deputy, 2*l.* 10*s*; usher and appendee, another deputy, wax, extras &c. &c. total, 15*l.* 0*s.* 9½*d.* These Scotch are close reckoners. I suppose the odd half-penny fees are of high antiquity. All this is without English and Scotch agencies, journies, stamps, &c. Indeed in the article of stamp duties, the Scotch patent is particularly favoured; an English patent pays in duties to government the excessive sum of 41*l.* 4*s.* total; the Irish 26*l.* 3*s.* 4*d.*; the Scotch patent goes comparatively scot-free, it pays in stamp duties total only 6*l.* 10*s.* yet it is at least as secure as the others are. High duties are therefore not essential to ~~the security of~~ a patent, as those sophi appear to think, who state, that for the interests of patentees they see no objection to the price of patents being higher. Upon the same logical principle, it would be for the interest of bread-eaters, that bread should be higher, and for those who want blankets, shawls, coats, shoes, &c. that they should pay 50 per cent. more than they do, for those articles.

We are certainly progressing in the axioms of political economy, and may possibly find, as our intellectual gas lights burn clearer, that it will tend to the incitement of industry and the extension of commerce, that government should take *all* the proceeds for state purposes. The population will then have only the trouble of enjoying gratis the hecatombs of roast beef and libations of ale provided without their care by a paternal government, as did the old Romans when their Consuls, Cæsars and Pheezars opened the public granaries, and set the fountains running with pure Tuscan juice, in commemoration of a ——'s accouchement, or the deification of a horse.

I am led to these observations by the conflicting views of several of the witnesses before the Committee, upon the subject of the price or cost at which a patent for inventions should be fixed. The extraordinary position, and to my uninformed judgment—the irrational grounds, which the advocates of high priced patents take may be allowed by your indulgence to form the subject of a future communication. When this most important feature of the investigation is disposed of, I purpose laying before the public the general outlines of my proposal for the efficient and cheap security of all property in inventions, upon one plain, broad, just, and all-embracing principle, viz. *that all property in inventions is equally sacred and entitled to an equal protection from the law.* Your's, &c.

VINDICATOR.

ART. VII.—MR. ARIS, ON AN INSTRUMENT FOR ILLUSTRATING THE PRINCIPLES OF REFRACTION.

To the Editors of the London Journal of Arts, &c.

GENTLEMEN,—I beg leave to propose, through the medium of your Journal, a simple mechanical contrivance or instrument, which I think might be very usefully employed for the purpose of illustrating the principles of refraction in a general way; it would be particularly useful to teachers of the science of optics and to those who give public lectures. Your insertion of the description and figure in your scientific work, will particularly oblige,

Gentlemen, your's,

J. R. Aris.

Sun Fire Office.

Let *a, b*, fig. 9, Plate X. represent the boundary of two transparent mediums, the upper one rare and the lower dense, the lines *d, c*, a ray of light incident at *c*,—*c, h*, the refracted ray—*a, f, b, s*, a circle the radius equal to *c, d*,—*d, c, f*, the angle of incidence; *h, c, s*, the angle of refraction; *d, m*, the sine of the angle of incidence, and *n, h*, the sine of refraction.

Any angle of incidence and the proportion that the sine of refraction bears to the sine of incidence in any medium being given, the angle of refraction may be found mechanically by the instrument represented in the plate, where *f, g*,—*g, h*, and *h, c*, represent three levers all equal to the radius *c, f*, and connected together by the centres *f, g, h*, and *c*, which with the radius *c, f*, forming the parallelogram *c, f, g, h*, one side of which *g, h*, having a groove down the middle of it; *d. c, l*, a lever equal to the diameter of the circle *a, f, b, s*, having a number of holes or divisions from *c*, to *l*,—*p*, a screw which passes through one of the holes, and also into the groove in the side *g, h*, of the parallelogram, or what would be preferable, a slider with a screw to pass into the groove in *g, h*.

Now to determine the position of the refracted ray, for example, in passing from air into water, the sine of refraction being $\frac{3}{4}$, or 75 of the sine of incidence, place the pin in the hole which stands against $\frac{3}{4}$ or 75, and letting it also pass into the groove in *g, h*, or move the slider till the pin stand against the division 75, then move the lever, *d, c, l*, to the angle of incidence, the end *d*, describing the arch of the circle *f, d*, but the point *p*, moving in the arch of the circle *q, p, r*, which is $\frac{3}{4}$, or 75 of the radius of the circle *a, d, f*; the sine *o, p*, of the angle *s, c, p,* will also be ¾ or, 75 of the sine *d, m,* of the angle *d, c, f.*

Now the use of the parallelogram is to transfer the sine *o, p,* from its place in the circle *q, p, r,* to *n, h,* in the circle *s, h, b,* which takes place in consequence of the side *g, h,* being always parallel to the diameter *s, c, f,* and the point *h,* being always in the circumference of the circle *s, h, b,* the side *c, h,* of the parallelogram will therefore always represent the refracted ray; and if the lever *d, c, l,* be moved with any given velocity, the side *c, h,* of the parallelogram will move with the corresponding velocity of the refracted ray; the point *h,* being always in the circumference of the circle *s, h, b,* and always ¾, or 75 of the distance of the point *d,* from the diameter *s, c, f.*

When the lever *d, c, l,* coincides with the surface *a, b,* of the medium, the angle of refraction will be the greatest. When the line *h, c,* represents the incident ray, and is placed so as to make the refracted ray *c, d,* coincide with the surface *a, b,* then the angle *s, c, h,* is the greatest that a ray of light will pass out from the dense medium to the rare. If the angle be greater it will not pass out at all, being totally reflected, the angle of reflection being equal to the angle of incidence.

Those parts of the instrument that represent the incident and refracted rays, may be in front of a wooden plane painted black, and the other parts may either be coloured black, or placed behind the plane with a communication through the centre to the parts in front.

When the boundary of the two mediums is a curve, as in fig. 10, one of these instruments may be applied to each point of incidence in the curve, the line *f, s,* coinciding with the perpendiculars to the curve at the points of incidence *c*; the levers *d, c,* in this figure represent divergent rays incident at *c,* which by refraction are rendered parallel. If the levers *d, e,* be placed in any other position as parallel and convergent, the levers *c, h,* will always represent the corresponding refracted rays whether they be either divergent, parallel or convergent.

Recent Patents.

To JOHN LEVERS, *of the town of Nottingham, Machinist, for his having invented or found out certain Improvements in machinery for making Lace, commonly called " Bobbin net."*—[Sealed 18th December, 1828.

SPECIFICATION.

" THESE improvements in machinery for making lace consist in a certain combination and arrangement of mechanism to be adapted to lace machines, constructed upon the principle commonly called or known by the name of *Lever's principle,* which improvements are designed to communicate the required movements to all the working parts of the machine from any rotatory first-mover, instead of actuating the parts by hand as heretofore.

" As the movements of all the working parts of an ordinary Lever's machine are well understood by practical mechanics, it is unnecessary for me to explain the constructions and motions of those parts by which the threads are twisted and the meshes of the net formed; I shall therefore merely describe the new mechanism by which the several parts of the machine are put in operation, by means of any rotatory first-mover; referring to the same by their respective name, as already known. The drawings hereto attached, (see Plate X.) do not represent a perfect machine, but only the frame and the principal working parts to which motion is to be communicated when the machine is put in operation either by hand or rotatory power. Fig. 1, is a front view of the machine with the improvements shown, attached to the different parts to which they are intended to give motion. Fig. 2, is the right hand end view. Fig. 3, is a section taken transversely through fig. 1, at the dotted line A, A, and fig. 4, is a section taken in the same direction at B, B; *a*, is a rotatory shaft, to which motion is to be communicated by a rigger *b*, and band leading from a steam engine or any other first-mover, or by the crank rod *c*, to be driven by hand. At the end of this shaft there is a spur wheel *d*, taking into a similar wheel *e*, which last mentioned wheel, is locked to the principal crank shaft *f*, but occasionally turns loosely upon it as its axle. There is affixed to this wheel *e*, a pinion *g*, taking into a larger wheel *h*, upon the lower shaft *i*. The rotation of the crank shaft *f*, actuates the parts called the joints of the machine and all the parts connected to them, by which the threads are twisted to form the meshes of the net.

The rotation of the shaft *i*, gives the proper motion of the point bars for taking up the twist, and of the pusher bars for dividing the bobbins and carriages,

In the operations of a *Lever's machine*, it is well known that there are five impelling actions given at distinct intervals, four of them by the *hands* of the operator for the purpose of forming the twist, and the fifth by the *foot* upon a treadle for effecting the taking up and dividing; consequently the shaft *f*, which drives the mechanism for producing the twist, must turn four times to effect its objects, and then remain quiescent while the shaft *i*, is moving the point bars and dividing.

Having thus described generally the principal movements of the machine, I now proceed to explain the manner of effecting the interrupted movement of the shaft *f*: that is the means by which it is made to revolve four times, and then to stand still for a space of time equal to one revolution.

There is affixed to the crank shaft *f*, the guide piece *k*, carrying a bolt *l*, which bolt is forced outwards by a spring; the outer end of this bolt *l*, takes into a staple *m*, fixed to the side of the wheel *e*, as in figs. 5, and 6, and by that means the shaft *f*, and the wheel *e*, are locked together; consequently when so connected the crank shaft *f*, revolves with the wheel *e*, which is the case during four successive revolutions.

In the section fig. 3, the cranks *n*, *n*, are shown connected by the pieces *o*, *o*, to the elongated arms of the joints *p*, *p*, and as the cranks revolve they move the joints backward and forward, and give the required motion to all the parts connected thereto, by which the twisting of the threads is effected.

After every fourth revolution of the wheel *e*, one of the tappets *q*, *q*, comes in contact with the pin or stud *r*, on the spring bolt *l*, as shown in fig. 7, and as they pass the centres it raises the bolt out of the staple *m*, and the wheel and pinion being now unlocked, turn freely round on the crank shaft, leaving the shaft stationary, and consequently the working parts quiescent. At this time a cam *s*, on the shaft *i*, near the middle of the machine, acts against the lever *t*, (see fig. 4,) which lever is connected by a pin and slot to the bar *u*, sliding through guide pieces, and by the raising of this lever the end of the bar *u*, is brought up behind the back landing bar *v*, and holds it steadily while the carriages are divided; at the same time also, another cam *w*, on the same shaft working against the lever *x*, raises the vertical sliding bar *y*, and its end, acting against the bent arm attached to the back pusher bar *z*, gives it the required motion for dividing the carriages. When the wheel *e*, has performed an entire revolution sliding upon the crank shaft, the inclined plain of the staple *m*, passing under the end of the bolt, allows the bolt to slip into the hole or socket of the staple, by which the crank shaft and the wheel are again locked together, and continue so for the next four revolutions, and so on. Figs. 2, and 8, being views of the end of the machines, shew the manner of working the point bars by cams and levers, and the Dawson's wheel for giving the lateral or slogging motions to the guide bars and comb bars; but these last mentioned parts are not claimed as forming any part of my present invention.—*Inrolled in the Rolls Chapel Office, June,* 1829.

Specification drawn by W. Newton.

To ISAAC BROWN, *of Gloucester Street, Clerkenwell, in the county of Middlesex, Watch Maker, for certain Improvements applicable to Watches, and other horological Machines.*—[Sealed 23d September, 1829.]

THE objects proposed under this Patent are, 1st, a method of winding up the works of a watch or other time-keeper, without a key, by means of a connection between the besel of the case, that is, the ring which holds the glass, and the going barrel, or the going fusee; 2d, certain modes of connecting these watches or time-keeper with an alarm, in order to discharge the alarm at any given time; and 3dly, a contrivance by which the case of a watch is rendered neater in appearance, by dispensing with the knuckle joint, at which it is usually opened. The invention is shewn in Plate XI. and is described in the following words:—

SPECIFICATION.

"My improvements consist, in the first place, of a new mechanical arrangement applicable to winding up watches, and other horological machines, and the manner in which the same is produced, applied, and carried into effect, is as follows:—When the watch to be wound is what is termed a going barrel, my contrivances applicable thereto will be best understood by referring to fig. 1, which represents a watch with a going barrel, to which my invention is applied, the dial being removed, that the new works may be seen; *a*, is the barrel ratchet, which keeps up the maintaining power. It is larger than is generally made use of, in order to gain power; *b*, is the click that takes into the ratchet, and prevents its return, and *c*, is the click spring; *d*, *d*, is the winder corresponding with the teeth of the ratchet, consisting of a circular rim, with an internal circular ratchet *a*.

The winder is generally made of steel, about half the thickness of the space between the pillar plate and dial, (but it may be made of brass or any other hard mettle that will stand.) The winder is let into the bezel of the case, and when the bezel is properly attached to the watch-case, the winder should be just free of the pillar plate, and is fastened to the bezel by means of screws or pins, or it may be cemented as most convenient. The squares, at *e*, *e*, *e*, are small studds to support the dial at its proper distance from the pillar plate. The small circles close to the squares represent the holes to receive the dial feet, which may be pinned in the ordinary way, or it may be secured by a screw through the face of the dial; the connection of the bezel and the fashion of the case will be better seen at fig. 29, where I have given a section of the case, that it may be better understood.

In this figure *a*, *a*, is the bezel, having a projecting rim underneath, at *o*, *o*, the out-side edge of which is turned with a slant in the form of a dove-tail, and fits into a groove in the case at *i*, *i*. The bezel is represented as raised out of the groove that it may be the better seen.

The way in which the bezel is prevented from rising out of its bed, when the watch is together, is by means of three or more screws, as represented at *p*, passing through the edge of the case at equal distances; the points of which come against the slanting edge, or dove-tail of the underneath projecting rim of the bezel and prevents its rising out, and at the same time allows the bezel to be moved round.

I sometimes use three steel studs, as represented at *g*, *g*, *g*, fig. 1, which are screwed to the plate, and project over the winder so as to let the winder move easy; *b*, fig. 29, is the barrel ratchet; *c*, *c*, the winder; *d*, the movement plate; *e*, the bottom of the case, and *g*, the glass. Now by examining fig. 1, it will be evident that when the bezel of the case *h*, *h*, (to which the winder *d*, *d*, is affixed) is moved round in a circular direction, from right to left, the teeth of the winder will take into the teeth of the ratchet *a*, which is fixed on the square of the barrel arbour, and will cause the barrel arbour to turn and the main spring of the watch to be wound up.

But when my contrivances are to be applied to the winding up of a fusee watch, it makes a material alteration, as it will be clearly understood by reference to the fig. 2.

In this instance *a*, *a*, is the winder with internal wheel-teeth; *b*, is the winding wheel, which revolves on a small hollow cylinder, rising from a steel plate, let into the pillar plate of the watch and secured by three screws, so that the cylinder does not project higher than the plate more than the thickness of the bottom of the winding wheel; fig. 3, is a perspective view of the steel plate with its cylinder; fig. 4, is a detached view of the winding wheel with its click and spring, and fig. 5, is a section of the same. Now it will be seen by reference to fig. 2, that the square of the fusee comes through the cylinder, (on which the winding wheel revolves) and rises so much above it as to receive the winding ratchet *c*, which is fixed upon the square and secured by means of a pin through the end.

I would here observe, that the winding ratchet is perfectly free of the winding wheel, so that when the winding wheel click is removed or lifted out of the teeth of the ratchet *c*, it will allow the fusee to move in any direction. Now it will be evident that when the bezel of the watch (to which the winder is attached) is moved round from left to right, the teeth of the winder, acting in the winding wheel, will cause it to revolve on the cylinder, and the click of the winding wheel falling into the winding ratchet, will carry the ratchet round also, which, being fixed upon the fusee square, will wind up the main spring of the watch.

When the watch is thus wound up, unless the click of the winding wheel *b,* is lifted out of the winding ratchet *c,* the watch cannot go. I therefore raise the click in the following manner: *d, d,* are two steel studs, a side view of one of which is given at fig. 6, they are screwed to the plate and project over the winding wheel in an oblique direction, as shewn in fig. 2; the points of these studs being free of the winding wheel click. The nibs at the points bear lightly on the bottom of the winding wheel, and prevent it rising off the cylinder. There is also, projecting from the point of the click, a fine circular spring, the extremity of which stands further from the centre than the click or click-spring, (as seen at fig. 4,) consequently, during the operation of winding, this spring is bent inward as it passes either of the studs; but if the bezel be turned in an opposite direction, or from right to left, the nib of either stud takes inside the said spring and lifts the click out of the winding ratchet, and when the point of the stud comes in contact with the point, or end of the click, it will go no further in that direction. I also put a pin in the winding wheel, at a little distance from the click, to prevent its being lifted too high.

By reference to fig. 4, it will be seen that the small spring, projecting from the click, is a little enlarged near the point of the click, so that when the nib or the stud has passed over the enlargement, it may not so easily move back again, which is to prevent the winder from returning by the wearing of the watch in the pocket. But I prefer a stop work, such as is generally used to most stop watches, which may be introduced at any convenient part.

In fig. 2, *g,* represents the stop work, the point of the arm taking in the teeth of the winder, which prevents the bezel from moving during the wearing of the watch.

I do not always make the winder to move in one direction, during the operation of winding, but I sometimes adopt the following plan, which is more simple and cheaper than the one just described; *a, a*, fig. 7, is the winding rack frame, which moves on a screw pivot or fulcrum at *g*; near the outer edge of this frame at *h*, are two pins, and there is a short projecting arm from the bezel at *n*, which comes betwixt the two pins, so that by moving the bezel the said frame is made to move backward and forward on its fulcrum, the distance of which movement is regulated according to the length of the winding rack *b*, which may be done by having another projecting arm from the bezel as at *i*, and two stops or pins, as at *p, q*, let into the plate. The winding rack when in the position as represented in the drawing, with its back end resting against the frame as at *s*, is a perfect segment from the pivot or fulcrum at *g*, and is connected with the frame by means of two arms *u, u*, one end of each of which are fastened to the rack and the other end to the frame by means of screw pivots, on which they move easily; the arms standing in rather oblique directions to the fulcrum of the frame at *g*.

Now it will be evident that when the bezel of the case is moved from right to left, it will carry the winding rack with its frame in the same direction, and the rack teeth taking into the teeth of the winding ratchet *c*, (which is fixed on the fusee square,) will move the ratchet round as many teeth as there are teeth of the rack brought into action; but when the frame is turned back again, the inclined side of the rack teeth coming against the inclined side of the ratchet teeth, the rack will be forced up and wlll pass back again without moving the ratchet.

There is a fine spring at *x*, screwed to the rack frame, the point of which presses against the end of one of the arms that projects a little beyond the screw pivot; the spring is intended to bring back the rack to its bearing at *s*, after it is past the ratchet. Thus by a reciprocating motion of the bezel backward and forward, the watch may be wound up, after which the bezel must be moved back till the arm *i*, comes close to the stop *p*, at which time the rack will be quite free of the ratchet, and allow the watch to go.

In order to make the rack rise better out of the ratchet when the bezel is thus brought back to its stop *p*, put a pin in the end of the rack at *o*, which projects into a segment groove in the plate at *d*, considerably wider than the pin, and of such length that the pin in the rack shall stop against the end, a little before the arm *i*, of the bezel reaches the stop *p*. Thus the rack will be thrown out of the ratchet teeth, and will fall in when the watch is wound. But there must also be a stop work used of the same description as that represented at *g*; fig. 2; to prevent the bezel from moving when wearing the watch in the pocket.

I also adopt the following plan of winding up a fusee watch, which is perhaps more simple than either of the foregoing, it will be understood by reference to fig. 30; *a*, *a*, is the winder fixed to the bezel as in fig. 2; *b*, is the winding wheel fixed on the fusee arbour; *c*, is an intermediate wheel turning on a pivot screwed into the arm or lever *d*, which has its fulcrum at *e*. The end of this arm may project a little outside of the case, or be connected to a slider on the edge of the case; so that by moving the end of the lever or slider, the intermediate wheel may be thrown in and out of gear with the winding wheel; but from the position of the fulcrum of the lever it will always be in action with the winder *a*, *a*. When the watch is to be wound the weel *c*, is to be moved into gear with the winding wheel *b*; and by turning the bezel the watch will be wound up; after which the intermediate wheel must be thrown out of gear by moving the slider the reverse way.

Of course it will be understood that the bezel of these two last winders are screwed in the groove or bed, on the same plan as that described above. I would also observe, I have introduced the motion wheels into the drawing, figs. 1, 2, and 7, merely to show the situation of the wheels, as I do not propose any alteration either in size or number to what is generally used.

But to make the watch as flat as possible with a going fusee, I remove the perpetual ratchet and going spring from betwixt the great wheel and fusee brass, or spiral barrel (where they are invariably placed), to the under side of the great wheel. The plan I have adopted is as follows, and will be understood by reference to the drawing; fig. 8, is the underside of the great wheel, *e, e,* is the sink or circular recess to receive the perpetual ratchet, which is sufficiently deep to prevent the ratchet teeth from rising above the surface of the wheel, as will be perceived by the section of this wheel, fig. 12. The ratchet revolves upon a pipe turned out of the wheel in the ordinary way. Within this sink there is a groove *b*, to receive the going spring, fig. 9, one end of which is pinned into the great wheel, and the other end into the perpetual ratchet; fig. 10, is the perpetual ratchet, with its clicks and springs, the teeth of which rise on the under side, and not on the edge as in the usual way; fig. 13, is a section of the same; fig. 11, is the fusee ratchet; fig. 14, is a section of the same.

The fusee is put together in the following manner; first, the great wheel is put on the fusee; next the perpetual spring is put into its groove *b*; the perpetual ratchet is next put on, and last of all the fusee ratchet, which is pinned to the fusee arbour, so as not to hold the perpetual ratchet too tight.

Now the way in which the spring detant acts upon the perpetual ratchet (a side view of which detant is seen at fig. 15), will be understood by reference to fig. 16, which shows that side of the plate next to the dial. The fusee is seen through the third wheel sink; *a*, is the great wheel; *b*, the perpetual ratchet with its clicks and springs, and *c*, the fusee ratchet. The spring detant is let into a groove in the plate at *d*, so as the hook of the spring shall bear lightly on the teeth of the perpetual ratchet; hence it must be evident that the spring detant will allow the perpetual ratchet to pass in one direction, but not in the other, as the hook will take hold of the teeth and prevent its return. By this arrangement I gain as much height in the fusee as the thickness of the perpetual ratchet.

I will here explain the way in which my keyless winding watches are put together and taken to pieces, which is as follows: After the movements of the watch are put together in the ordinary way, I fasten them into the case by means of screws, or otherwise after which (if it be a fusee watch) I screw on the small steel plate with its cylinder, through which the fusee square comes; next I put the winding wheel on the cylinder and secure it in its place by its two studs; I then pin the winding ratchet on the fusee arbour; after which I put on the bezel with its winder, which is secured from rising out of its groove as before explained. The dial is next put on and then the hands, after which the glass is snapped into the bezel.

When the watch is to be taken to pieces again, I first take out the glass by introducing a small wire up a hole that is made through the bezel against the edge of the glass, as represented at *o*, fig. 29, which will throw out the glass; I then take off the hands, then the dial, &c.

To make the watch case look uniform and neat, there being no joint to the sliding bezel, I do away with the outside joint of the bottom of the case, by introducing what I shall call a spring knuckle, which is not seen from the outside.

This contrivance is shewn at fig. 17; *a*, is the bottom of the case that contains the spring knuckle; *b, b*, is the spring, which is made in a half circle to suit the size of the case; it is rather thick towards the ends where it is fastened to the bottom of the case, either by screws; or otherwise, the other part of the spring is rather thin till it comes near the knuckle, so that it gives way with very little pressure. The knuckle stands higher than the spring, and is made of such height as to accommodate the thickness of the case, and is made out of solid steel spring tempered. Fig. 18, is a perspective view of the spring knuckle; *c*, is the stud that is screwed to the bottom of the case, and projects a little over the spring, and is to prevent the case being opened too wide so as to strain the spring. Fig. 19, is a side view of this stud; *d, d*, is the joint or knuckle of the case.

My invention farther consists of a new machanical arrangement and combination of works, applicable to all purposes where the locking or unlocking of an alarum is required, and also to the setting of the striking part of a clock to strike the hours and quarters, if required.

Fig. 20, represents what is usually called the dial work of the watch to which my invention is applied; and first, as respects the alarum part; *a*, is the alarum snail, the back arbour of which goes through both of the movement or watch plates; the front arbour comes through the centre of the alarum dial, *a*, fig. 27, and carries the alarum hand; on the end of the back arbour is fixed a milled head or nut, which coming close to the plate prevents the snail from rising out of its place, and serves also to set the alarum hand, as it will be evident that the alarum hands may be moved to any part of the dial by the milled head; a detached view of which with the snail is seen at fig. 21.

The use of the notch on the edge of the snail, with one side perpendicular to the centre, and the other in a slanting direction, will be explained hereafter; *b*, is the alarum wheel, which is the same size and number as the hour wheel *h*, the teeth of which take into the hour wheel teeth, and consequently performs a revolution in the same time, which is twelve hours. It is here represented as pierced to show the action of the unlocking lever upon the alarum snail; it goes upon the front arbour of the alarum snail, and is prevented from moving too easily on the arbour by means of a circular spring, which presses against the arbour as shown in the detached alarum wheel at fig. 22; *c*, *e*, is the unlocking lever, the curved point of which rests on the edge of the alarum snail, and the tail lays close to the neck of the pendant. It is kept in this position by means of a spring *d*, which presses against a small projecting arm of the said lever.

Now it must be evident, that as the alarum wheel is fixed pretty tight on the arbour of the snail, it will carry the snail along with it, so that by the going of the watch the notch in the edge of the alarum snail will be brought round to the curved part of the unlocking lever every twelve hours, and as soon as the perpendicular side of the notch passes the curved point of the unlocking lever, it is forced into the notch by means of the spring *d*, and the tail of the lever is thrown out from the pendant, but the sloping side of the notch raises the lever again to its former position.

In the next place the arrangement for setting of the striking part of a clock is as follows: *e*, fig. 20, is a pinion of the same number as the common pinion, the arbour of which goes through both plates, and has a milled head on the end of the arbour, exactly the same as the arbour of the alarum snail; this pinion is connected with the minute wheel *g*, by means of an intermediate wheel *f*, which may be cut in any number of teeth that may be required, as it is only designed to change the direction of the pinion *e*, and hence it must be evident that the pinion *e*, will perform a revolution in the same time as the cannon pinion which is an hour.

To the pinion *e*, is attached an arm, with a pin near the point, that takes under the lower arm of the clock, discharges *h*, and lifts it every time it comes round, (it is represented in the drawing as partly lifted), but when the lower arm of the clock discharger falls off the pin in the arm of the pinion *e*, the upper arm of the discharger is brought back to the neck of the pendant by means of a spring, *k*, which presses against a short projecting arm of the discharger.

By means of the milled head on the end of the arbour of the pinion *e*, motion may be communicated to the cannon pinion, and by that means the watch may be set to time. But to prevent any accident by moving the minute hand back past the hour, I make the lower arm of the clock discharger as represented at fig. 23, which is on the same principle as the passing spring of a chronometer, and will let the pin in the arm of the pinion *e*, pass backwards without, moving the discharger.

"The alarum dial is a small dial, the same size as that of the second's circle, and is fixed to the alarum wheel by means of a small pipe that projects from the centre of the alarum wheel, and fits tight into the centre of the dial. The dial is painted like a small watch dial with the hours as represented at fig. 27, and there is a circular opening in the watch dial, through which the alarum dial is seen as at *a*, fig. 27,

The alarum hand must be put on in that position that it will point exactly to the centre of the pendant, at the time the unlocking lever falls, or is thrown out from the pendant, and when the twelve marked on the alarum dial stands in the centre of the pendant, the hour and minute hand should be put on, so as to point in the same direction, which will be twelve o'clock.

Now it will be seen that when the minute hand has made one revolution and again points to the pendant, the hour hand will point to one o'clock, and the one on the alarum dial will point to the pendant, and so on with all the other hours; so that by fixing a point in the watch dial opposite the centre of the pendant, it will point to the hour of the day on the alarum dial; and as the alarum hand and dial move together, and the unlocking lever is thrown out whenever the alarum hand points to the pendant, it is evident, that whatever time the alarum hand is set to on the alarum dial, the unlocking lever will be thrown out from the pendant exactly at the same time.

I also put a small slider on the edge of the case, on the same side of the pendant as the unlocking lever, so that when the alarum is not wanted it may be pushed close up to the tail of the lever, and take the pressure of the curved point of the edge of the alarum snail, that it may be no hinderance to the going of the watch.

I shall now proceed to describe the manner in which the alarum and clock movement is operated upon, by means of the unlocking lever and clock discharger, before which I would observe, that I have given a section or side view of the alarum and clock movement in its detached state together, with the index plate at fig. 24; the frame *a*, *a*, that contains the train of wheels, is made smaller than the index plate *b*; in order that the bell *c, c,* may cover the works. The bell is screwed to a stud *d,* that is fixed in the centre of the upper plate, there are two holes made through the bell opposite the barrel arbors, that the maintaining power may be wound up either by a detached key, or by milled heads screwed upon the arbours as represented at *e, e.*

The alarum consists of a going barrel, with a steel wheel at one end, which is cut in ratchet teeth for the purpose of working the hammer, and at the other end is the great wheel that drives the train. The train generally consists of three wheels and four pinions, but I sometimes make the alarum movement with a contrite wheel on the end of the going barrel, which drives a pinion with a balance or crown wheel; this acting, a verge works the hammer fixed on the arbour of the verge.

The clock has also a going barrel with the same number of wheels and pinions, together with the striking hammer and its spring, which are arranged in the same manner as most modern striking clocks. The two wire tails *g, g,* that project through the index plate *b,* are connected one with the alarum locker, and the other with the hour regulating lever, which will be better seen at fig. 25; where *a,* is the hour regulating lever, which acts on a pivot screwed in the plate; *b,* is its wire tail; *s,* its regulating spring; which is made very thin close to where it is screwed to the lever, and at the other end is a hook which takes hold of the star wheel *e,* and moves it every time the lever is lifted by the clock discharger; (a side view of this spring is shewn at fig. 26.)

From the shape of its hook it will be evident that when the regulating lever is brought back by means of its spring *c*; after the clock has struck, the sloping part of the hook coming in contact with the teeth of the star wheel, (which is also bevelled on the side) will act on an inclined plane, and raise the spring so that the hook will pass over without moving the wheel, and be ready to move round the star wheel another division whenever the lever is again lifted. The jumper *d,* with its spring, is to prevent the star wheel from moving in more than one division at a time.

The star wheel *e*, is cut in twelve teeth and is fixed on an hollow cylinder, together with the clock snail *g*, at a little distance from each other, and revolves on a pivot screwed into the centre of the plate; the cylinder is of such length as to project a little through the index plate, and carries the hand shown at *a*, fig. 28.

The rack hook *h*, has a curved tail that comes in contact with a short arm of the regulating lever, by which means, whenever the lever is lifted by the clock discharger, the hook is raised out of the rack *i*, and the rack is forced back by means of its spring *k*; and its arm falling against the snail, regulates its striking; *n*, is the gathering pallet that winds up the rack as the clock strikes.

There is a pin at *p*, in the regulating lever that projects through an opening in the plate, and comes in contact with a pin in one of the wheels whenever the lever is lifted, and prevents the clock from striking until the lever falls back. The alarm hammer is shown at *v*, and *s*, is its spring.

Now if it is required to make the clock chime the quarters, nothing more is necessary than to cut the star wheel in 48, and make the clock snail in the same way as the snail of most of the modern clock watches that chime the quarters, and also make the pinion *e*, in the watch, shown at fig. 20, with four arms instead of one, and it will strike the quarters as it goes. It may also be made to repeat the power, by forming a connection from the rack hook to a stud, or knob, at any convenient part of the stand as at *b*. fig. 27, which may be depressed by the finger, or any other means, and disengage the rack hook.

The alarum locker is made with an elbow, as shown, by dotted lines, at *t*, fig. 25; it is fixed on an arbour which is pivoted, and acts inside the movement plates; a little of the edge of the plate being filed away to allow the wire tail *u*, to pass through the index plate. At the other end of the locker is a pin that rests against the edge of the fly wheel *o*, which has also a pin in its edge, and is likewise represented by dotted lines; it is kept in this position by means of a fine spring *w*, that presses against the lower arm of the locker so that the alarum cannot go off, until the pin of the locker is removed from the edge of the wheel, which is done every time the unlocking lever falls out from the pendant, as it comes in contact with the wire tail *u*, of the alarum locker, and lifts it from the fly wheel *o*.

The way in which the watch is attached to the alarum and clock movement, is as follows,—fig. 28, is a stand made of wood or metal; the alarum and clock movement is let in on the back of the stand about half way through, with the index plate, to shew in front as at fig. 28; *a*, being a small dial marked in the middle of the plate, and the hours painted on it as represented. The opening in front is made to suit the size of the watch case, when lined with leather or velvet. The bottom of the watch case is kept at a little distance from the index plate, by a ring of leather, *b*, so that it shall not come foul of the index hand; the two wire tails of the alarum locker and regulating lever project into this opening, through the index plate over the twelve, and come a little past the pendant, and at such equal distance from each other as to allow the neck of the pendant to go betwixt them; there is also a sink cut for the nob of the pendant, so that the watch shall always go in the same position.

Now to attach the watch, so that it shall strike the hours right, the index hand must be moved in the direction of 1, 2, 3, &c. to the hour it struck last. Suppose for example, the time by the watch is half-past twelve, the hand is right as represented at *a*, fig. 28; but if the time by the watch is past three, the hand must be put to three, and when the watch is attached as represented at fig. 27, the clock will strike the hours as the watch goes. When the alarum is to be used, nothing more is necessary but to set the alarum hand to the time at which it is to go off on the alarum dial; place it in the stand and wind up the alarum. The points upon which I ground my exclusive right and privilege to the foregoing inventions are, 1, The new combinations of mechanism which produced the winding apparatus; 2, The alarum snail and wheel, with the unlocking lever and its spring; 3, The arrangement of mechanism for the clock as shewn in fig. 20, in communication with the hour regulating lever as shown at *a*, fig. 25; 4, The arrangement of mechanism connected with the oing fusee and its spring detant *d*, fig. 16; and lastly, the method of opening the bottom of the case, by the introduction of a spring knuckle, whereby the outside point of the case is dispensed with.—[*Inrolled in the Rolls Chapel Office, November*, 1829.]

Specification drawn by the Patentee.

To Thomas Hillman, *of Mill Wall, Poplar, in the county of Middlesex, Mast maker, for certain improvments in the construction and fastening of made masts.*—[Sealed, 1st May, 1828.]

This invention consists, the Patentee says, in fastening together pieces of timber for the purpose of making ships masts and other spars, by means of internal longitudinal dovetailed battens, the particulars of which are given as follows :—

SPECIFICATION.

Plate XII. fig. 1, is a transverse section of a made mast on my patent plan; *a, b, c,* are the three main pieces of timber which form the mast, *d, e, f,* are the three battens, dovetailed on their edges, by which the three main pieces are held together. Fig. 2, is a view of part of the main piece *a*, showing how the battens *d*, and *e*, fit into the groove cut in it for their reception; it will be observed that these battens are rather wider at their lower ends *r, s,* and in fact, they should be made tapering slightly in width the whole way from the lower to the upper end, but if their sides are parallel, they will answer the purpose, though perhaps not quite so well.

Fig. 3, shows a plan for scarfing the main pieces, when it is required to make long masts, or when for economy's sake, it may be useful to use short timber; *q*, is a transverse dovetailed pin or batten for holding the scarfe together, and which if made tapering also to one end, will have the effect of drawing the joint of the scarfe closely and firmly together; *v*, is the dovetailed groove to recieve the batten. Fig. 4, is a separate view of the transverse pin or batten *q*.

" Fig. 5, is a representation of part of a mast made on my patent principle, of four pieces; *g, h, i, k*, are the main pieces, and *l, m, n, o*, the longitudinal battens, which are shown as projecting through or beyond the main pieces; this figure must be considered rather as a diagram, than any regular drawn figure; the rules of perspective having been disregarded, in the hope of thereby giving a clearer idea of the plan.

Fig. 6, represents the manner of fastening a mast made of eight main pieces on the patent principle; the masts of this size may either be hollow in the centre, which I should prefer, or they may have a core or main fastening *i*, in which case, dovetailed battens, such as at *p*, should be raised or carved on such core or central fastening, and corresponding grooves in the main pieces, as here shown.

Fig. 7, is a view of one of the main pieces of an eight pieced mast, with its two grooved battens and groove for the core.

Fig. 8, is a transverse section of a mast made upon my patent principle, showing how the battens instead of being made in separate pieces may be raised or carved upon the main pieces of the wood itself, of which they are composed; in such cases a groove and a batten will be found to each main piece, instead of two grooves, as in the former case.

Fig. 9, is a representation of the same manner of uniting the main pieces, where they are four in number, and fig. 10 where there are eight main pieces.

It should be here stated, that three main pieces are the number I should recommend for masts from seventeen to twenty one inches in diameter; four main pieces for masts from twenty one to thirty inches in diameter; and eight main pieces for masts from thirty to forty two inches in diameter. But it will be evident that the number of main pieces may vary at the option of the mast makers, as almost any number are capable of being united by the longitudinal dovetailed battens.

In order to construct or put my patent masts together, each main piece, with the grooves neatly cut in them, should be brought to its place, and either lashed or temporarily hooped together, with the wide part of the grooves to the heel of the mast, the battens should then be entered into the groove with the small end foremost, and gently and carefully driven up the whole length of the main pieces and cut off if neccssary. On account of the length of the mast, the battens may be in two or more lengths, as well as the main pieces; when this is done, the temporary hoop or lashing may be removed, and the mast hooped in the ordinay way.—*Inrolled in the Inrolment Office, November,* 1828.

Specification drawn by Mr. Rotch.

To WILLIAM STEAD, *of Gildersome, in the county of York, Mill Wright and Machine Maker, and* JAMES STEAD, *of Doncaster, in the same county, Wood Valuer, for their having invented a paddle-wheel upon a new and improved principle, for propelling steam packets and other vessels.*—[Sealed 18th Dec. 1828.]

THIS invention is a propelling wheel, the paddles of which are made to revolve upon axles, for the purpose of enabling them to enter into and pass out of the water edgewise, at the same time presenting their broad surfaces to the water in the act of propelling.

The Patentees have appended to their specification, a perspective drawing, representing the complete wheel in operation, which is shown in Plate XII. fig. 15.

The wheel is proposed to be about ten feet in diameter, and five in breadth, having sixteen paddles, or half paddles, for, when closed in the propelling position, they are only equal to eight; but the number of paddles must be increased or decreased according to the diameter of the wheels, or the depth they are intended to work in the water, as they are calculated to work at any depth; or if even the whole wheel were immersed, they would have the same power of propelling as if only partially immersed.

The paddle marked *a, a,* are those supposed to be immersed in the water, and in a propelling position, and the paddles *b,* are in the act of closing; and all the other paddles *c, c, c,* have their edges standing vertically in planes, parallel to the rim of the wheel. When the wheel is put in motion, the paddles *b,* will assume the positions shown at *a,* while the paddles *a,* will pass into the positions shown at *c,* with their edges vertical and planes parallel to the rim, by which means they are enabled to discharge the water in rising, which otherwise would hinder the propelling power and progress of the vessel; this contrivance also prevents the swell caused by the common paddles. As the wheel revolves, the paddles *c, c,* assume the positions shown at *b,* and so on in succession.

When it is found necessary to turn the wheel the contrary way, then all the paddles perform a counter revolution, and take the same positions for propelling a vessel backwards, as they had done to propel it forwards, as they work equally well either way.

The wheels are attached to the side of the vessel by the axle passing through, in the same manner as the common propellers, or they may be immersed under water, or in any other direction that may be thought best.

The Patentees explain the parts of the paddles and the movements, which they claim as their invention in these words. "Each half paddle turns upon its axis parallel to the arms of the wheel in two cross bars, which are fastened to opposite arms; it also passes through another bar, which is fixed about a foot from the axis of the wheel, and which is broad enough to join and screw to the next bar, so as to form, when completed, an octagon about the axle of the wheel, (as shown detached in fig. 16), which is a section of the wheel. The bars are bolted and screwed to the arms, and also to the bosses *d*, as seen in fig. 15.

"The shaft of the paddle having passed through the above bar, has a crank fastened to its end of three inches radius, but must be increased or decreased, according to the diameter of the wheels. The end of the crank is of a globular shape of three inches diameter, and which is made to move in a groove, (as may be seen in the section, fig. 16, and marked *e, e,*); the grove is made in a round boss or collar, formed for the purpose, and in the form of the diagram, fig. 17.

"The two bosses so constructed for each paddle are fastened on a tube *f*, in the section, which tube commences at the inner side of the boss of the wheel, marked *d*, in fig. 15, and passes through the opposite boss about three inches; to which tube a catch is fixed, to correspond with a like catch fixed to the inside of the frame in which the wheel works.

"The use of the catch is to hold the tube stationary, on which the two grooved bosses, or collars, are fixed; so that when the wheel is put in motion the tube remains fixed. The cranks on the ends of the paddle shafts revolved with the wheels, and the globular part formed on the end of each being in the grooves of the bosses or collars fixed on the tube, will cause the cranks to turn obliquely, by passing in the grooves from 1 to 2 (see fig. 17); for, while the end of the crank is in the part of the groove marked 1, the paddles are vertical, and their planes parallel to the rim of the wheel; but when the ends of the cranks pass into the part of the groove seen at 2, then the paddles will be placed at right angles to the position before named, and in a propelling position.

" By the passage of the cranks in the grooves before described, and which is caused by the revolution of the wheel, the position of the paddles are changed with greater felicity. If the wheel be made to turn the contrary way to what we are now supposing, the catch upon the tube turns with the wheels, till it meets the catch on the frame, immediately the paddles are put in motion, and act in the same manner for propelling as when turned the other way.

" The axle, marked *g*, in the section, fig. 16, is fixed firmly in that boss next to the vessel's side, and passing through the tube rests upon the outer frame.

" The paddles and shafts may be of metal, or partly of metal and partly of wood, according to the power they have to resist. The paddles rest when in the water against the arms of the wheels, and also a stay in the middle of the cross bars.

" It will be necessary to brace the wheels from one cross bar to the other when strength is wanted, but which brace forming no part of our invention, is omitted in the drawing.

" The diagram, fig. 17, represents the race of the groove, as if the groove were placed round the boss upon the tube, and we fix a small roller in two of the angles of the oblique part of the groove, which will cause the paddles to work better. When the motion is changed, for the purpose of propelling backwards, the place of these rollers is seen in the diagram.

"And we further declare, that our invention consists in so constructing and combining the paddles of the wheel with the cranks and grooved collars, or bosses, shown above, as to cause them to rise in a vertical plane parallel to the sides of the wheel, after performing their office of propelling, and again adapt themselves in succession every time the wheel revolves to the performance of that office. —[*Inrolled in the Petty Box Office, February,* 1829.]

To THOMAS BONSOR CROMPTON, *of Tamworth, in the county of Lancaster, Paper Maker. and* ENOCH TAYLOR, *of Marsden, in the county of York, Millwright, for their invention of certain improvements in that part of the process of paper-making which relates to the cutting.*—[Sealed 13th May, 1828.]

THIS invention applies to the cutting of paper made in those machines which produce perpetual, or what is called endless sheets that is uninterrupted lengths of paper, from a traversing endless web; instead of distinct sheets made by hand in small moulds; which endless paper requires to be cut into suitable portions as sheets of the ordinary size, and it is for this purpose that the present improved machinery is designed.

From some of the paper-making machines above alluded to, the endless paper, in its wet state, is passed over hot cylinders between felts, for the purpose of being dried (see Crompton's Patent, Vol. II, page 253, of our First Series), and is either folded upon a reel to the proper size, and cut afterwards in the folds in a distinct machine, so as to form sheets; or a peculiar construction of shears, is adapted to the drying machine; and it is by their action cut transversely into sheets as it passes; but in both these instances the paper is cut transversely, and forms sheets of the whole breadth of the machine. As, however, it is found to be desirable to cut the paper into smaller portions, as sheets of the size of post paper, foolscap, &c. the present invention is a machine for cutting the paper lengthwise, in order to divide it longitudinally into two lengths of half the original breadth.

The machine is represented in Plate XII. at fig. 11, which is a side view; *a*, is a roller on which the paper is supposed to be wound, either in a damp state from the making machine, or in a dry state from the drying machine; the paper is represented by the line *p*, *p*, and extends to the receiving roller *b*, on which it is to be wound after having undergone the process of cutting longitudinally; *c*, *d*, and *e*, *f*, are two pair of drawing rollers, which may be made either of wood or metal; the upper rollers, *c*, and *e*, have pullies on their axis for driving bands; *g*, and *h*, are two circular blades, which constitute the cutters, and it will be seen they intersect each other in the line of the paper.

The upper roller *g*, has a driving pulley on its axis to which the first motion is communicated; and the axis *r*, of the lower circular blade *h*, is thrown a little out of the perpendicular of the bearing at this side of the machine, which is done for the purpose of opening the back edges of the blades to make the delivery of the paper more free; while it closes the front edges and makes them act better against each other, and cut the paper more sharply. The weights, *v*, *v*, *v*, are merely friction weights.

The manner of giving motion to the rollers, is as follows,—*k*, is the shaft or axis of the upper blade *g*, of the cutter, and to this the power, whether steam or otherwise, is applied. On the end of this shaft there is a pulley, and also on the ends 'of the rollers, *c*, and *e*, which, by means of the bands *m*, and *n*, are driven from the shaft *k*.

There is also a band from the pulley of the roller *e*, to a friction pulley on the roller *b*, for the purpose of driving it, and which, as the thickness of the paper increases, requires the friction pulley to slide or slip upon its axis, to prevent the paper tearing by its accumulation upon the roller; this roller is called the receiving roller.

It should be stated, that wherever the rollers are in pairs, as at *c*, *d*, and *e*, *f*, the under ones are driven by spur gear, at the opposite ends to those shown, as will be seen by reference to the next figure, and the under cutter *h*, is in like manner driven from the cutter *g*. Fig. 12, is a view of the opposite side of the machine, to that exhibited in the preceding, and shows the spur gear before alluded to.

The rollers *e*, *f*, should be driven at the same speed as the rollers *c*, *d*, so as to keep the paper uniformly tight.

Fig. 13, is a plan or horizontal view of the invention; *l*, is a sliding boss with an adjusting screw, to which boss the upper circular cutting blade is screwed; *g*, is the steel cutting blade, and the machine being here represented in the act of cutting the paper, of course the lower blade of the cutter will be underneath, and is, therefore, represented by dotted lines; this figure shows at *r*, the necessary angle at which it is required to place the shafts of the cutters, and by this arrangement it will be seen that the back of the blades at *s*, just run free of each other, while at *t*, they touch each other; *w*, represents the longitudinal cut in the paper.

Fig. 14, is a separate view of the upper and lower blade of the cutter; *g* is the upper, and *h*, is the lower blade, which are screwed on the sliding bosses *l*, *z*. These bosses have adjusting screws for the purpose of setting the blades nearer together when necessary; the blades have square or acute edges, and cut by their action against each other.

It is only necessary further to state, with reference to the general action of the machine, that motion being given to the shaft *k*, of the cutter *g*, the drawing rollers *c*, *d*, draw the paper from the feeding roller *a*, which is kept from delivering it too freely by the friction weight *v*; at the same time the second pair of drawing rollers *e*, *f*, moving at the same speed as *c*, *d*, stretch the paper tightly for the cutter to act upon, while the roller *b*, winds it up, as it is cut.

The above is an explanation of the invention, as it is to be practised when used in a separate and independent state from the other processes of paper-making, but the invention may be also applied to the other machinery used in paper-making with very slight alterations.

Thus, for example, if the machine above described, is applied beyond the dry pressing rollers, or to the winding reel, commonly used and well known to paper-makers, it will be obvious, that the roller *a*, may be left out of the machine, and that the paper may pass at once to the rollers *c*, *d*, by speeding the motion of the cutting-machine exactly to the velocity with which the paper is produced; and likewise the paper when cut longitudinally may pass directly to another machine, or into sheets instead of winding round the roller *b*; and in this the roller *b*, may be taken away or omitted in constructing the machine, without altering or affecting the material parts; which are the rollers *c*, *d*, and *e*, *f*, and all that is contained between, as described above.—[*Inrolled at the Inrolment Office, July*, 1828.]

To RICHARD HALL, *of Plymouth. in the County of Devon, Tailor and Woollen Draper, for his having invented a Composition applicable to certatn fabrics, or substances, from which may be manufactured boots, shoes, and various other articles.* [Sealed 10th March, 1829.

THE subject of this patent is intended to be an artificial leather made by coating cloth, or any other fit substance as a basis,, with a composition consisting of caoutchouc, (Indian rubber) with wax, resin, and blacking, melted and mixed together.

The composition is to be made by combining the following proportions of materials:—About one pound of bees wax, half a pound of caoutchouc and a quarter of a pound of rosin; which are to be coloured by half a pound of ivory black and a quarter of a pouud of lamp black; but though these proportions have been found to answer the purpose well, they need not be strictly adhered to. These matters are to be melted together in a suitable vessel, and if we understand the patentee correctly, the composition is to be kept hot by standing over a vessel of boiling water.

The cloth intended to be coated is to be distended, and then the composition laid upon it with a brush and sufficiently rubbed on in the first instance to make it enter into the fibres and interstices of the cloth or other material. It will be necessary to put several coatings of the composition on the face of the cloth in order to give it sufficient substance, and to harden it between each coating in a drying chamber. There are however no particular directions as to the mode by which the composition is rendered hard, which as respects the melted caoutchouc cannot be effected simply by a warm atmosphere.

Instead of the above materials, spermaceti, naphtha, or turpentine may be employed in place of the bees wax, and for the resinous material frankincense, asphaltum, or bitumin may be adopted. For the colouring matter any opaque substance may be employed, which shall be found to give the desired hue, either of black or any other colour, and when the composition is dry it may be cut into suitable shapes and made up into boots and shoes.—[*Inrolled in the Inrolment Office, September,* 1828.

A patent was granted in 1824 to Mr. Thomas Hancock, for making artificial leather from caoutchouc spread upon cloth. (see the Xth vol. of our First Series, *p.* 22.

N. B. This and the 16 pages following are numbered wrong. [illegible].

REPORT

Of the Select Committee of the House of Commons on the Laws of Patents.

(Continued from page 241.)

Mr. Charles Few, again called in; and examined.

Will you have the goodness to state any views which you have with respect either to the inconveniences of the present law, or any amendment which you think might be introduced?—The inconveniences I stated upon a former occasion, and in consequence of a question which the Committee put to me, I have turned my attention to the subject, and I have put down on paper a few suggestions, which I will read; they are founded upon the idea that the plan of a commission will be adopted. I would propose that the commission should consist of five persons; two to be selected for chemical knowledge, two for mechanical knowledge; one a barrister of years standing. The barrister is proposed from the practical knowledge he may by presumed to possess on questions of evidence, which must constantly arise between contending parties. The commissioners to be nominated by the Treasury or by the Lord Chancellor, or by the Chief Justice of the King's Bench, or the Attorney General; or by the heads of certain scientific institutions, *ex. gr.* Royal Society, Royal Institution, &c. &c. New commission every ten years: power of removal to be in the party nominating: commissioners not to be younger than thirty, nor older than fifty; commissioners to take an oath for impartially administering the powers delegated, and of secrecy. The patent right to be vested in the patentee or his nominee, from the date of his petition to the King. The affidavit and petition to be the same as now in use, excepting that the inventor may pray the grant to a nominee. The reference to be made to the Attorney General only. The Attorney General for the time being to appoint a clerk to the commissioners. Caveats to be entered with such clerk only. Notice to be given by him per post to each party, entering a caveat within four days after receipt of the reference of the petition to the Attorney General. Forty shillings to be paid annually by each person entering a caveat, and for each caveat. If no opposition to the application entered with the clerk within four weeks, the applicant to be entitled to perfect his patent. The party opposing, on entering the opposition, to be called on to make a deposit in the first instance 20*l.* with the clerk. The applicant to be thereupon called upon to make a like deposit. If the oppositon is successful, or the patent is not prosecuted, the deposit to be returned to the party entering the caveat; and the applicant to pay the costs out of the deposit made by him; if unsuccessful, the costs of the patentee, of the commissioners, and of the clerk to be paid, by the party entering the caveat, or so far as the deposit will extend; the residue, if any, to be returned. The commissioners for same purposes to be empowered to order further deposits by each. The fees to be payable to the commissioners for attendance, and to the clerk, (or a permanent salary to the latter) to be settled by the Attorney General. On a caveat or caveats being entered, the Attorney General to refer the same to three of the commissioners, of whom the barrister to be one, who are to examine the parties and their witnesses on oath, (if such commissioners deem it necessary,) and adopt such other means for satisfying their minds on the subject as they shall think expedient, and report the result to the Attorney General, who thereupon shall give his fiat for granting or withholding the patent. If the three commissioners are not unanimous in opinion, then, on the same being notified to the Attorney General, the case to be reheard before the five, and the decision of the majority to be final. Commissioners not to proceed on caveats until the four weeks allowed for entering same have expired. If either party prefer the hearing taking place before the five, such to be allowed, on the party requesting paying the fees of the additional two commissioners. If the patent is to issue, the clerk of the commissioners to receive from the patentee, on his bespeaking the patent, the sum of (being the amount of fees now payable at the different offices through which patents now pass; together with the amount of the stamp duty to be from time to time payable on obtaining patents; and the further sum of twenty guineas) in lieu of the ten guineas heretofore charged for soliciting a patent, which twenty guineas, and the forty shillings to be paid on entering a caveat, to be subject to the incidental expenses attending the execution of the commission; *ex. gr.* rent of rooms of chambers for carrying on the business of the commission, remuneration to commissioners, and such other charges, fees and disbursements as the Attorney General shall from time to time authorize; and the residue to be accounted for annually, and paid to the Treasury on the certificate of two of the commissioners, and on the oath of the clerk. All fees received to be paid into a banker's, to be nominated by the Attorney General for the time being, in the names of the five commissioners, and not drawn out but on the signature of three commsssioners. The proportions payable at the different offices before enumerated, to be paid out of the general fund quarterly at each such office. The office for transacting the business of the commission to be open from ten till four daily, (the usual holidays excepted,) and the caveat book to lie open to applicants for inspection during those hours on payment of one shilling for each search, the same to be accounted for as directed with respect to the other monies authorised to be received. If an applicant shall not bespeak his patent within four months after presenting his petition to the King, unless caveats are then under discussion, and in the latter event, not within one month after the same are disposed of, the right thereto under the petition presented to be forfeited. Parties to be at liberty to enter and proceed on caveats at any time before patent passes the Great Seal. All specifications to be inrolled (in the usual manner) within six months from the date of the original petition, or within two months after caveats are disallowed, in the option of the patentee, with the clerk to the commissioners; and parties to be at liberty to specify by model instead of or in conjunction with a written description. A patentee not to have any right of action for any piracy or supposed piracy of his invention which may take place between the time of his petitioning for the patent and the inrolment of his specification. A fee of one shilling to be paid on each search for a specification, and copy to be obtained at the expense of an applicant. A patentee to have liberty to present a petition to the Attorney General for leave to amend his specification, or inrol a further specification (before petition presented to recall his patent); and if the Attorney General shall see cause from the circumstances stated, he may refer the propriety of permitting the same to such three of the commissioners as he shall think fit, and order and allow such amendments or further specification, if the three commissioners shall certify that in their judgment no fraud or concealment was intended by the patentee on inrolling the original specification; any person to have the power of questioning the patentee's right to the subject-matter of the addenda to the original specification, in the same manner as he may question the original grant. A patentee on inrolling specification of improvements adopted by him during the continuance of his patent, to be thenceforth entitled to the exclusive right to such improvements until the expiration of his original patent term; this permission not to preclude him from applying for a patent to secure such improvements as heretofore practised, if he shall prefer so doing. Any party to be at liberty to petition the King to recal letters patent, or to expunge matter introduced on an amended or further specification, stating therein the grounds on which the petition is founded; such petition to be referred through the Attorney General to the commissioners, who are to examine the parties and their witnesses on oath, and adopt such other methods as they may think proper for satisfying themselves on the propriety of recommending His Majesty to grant or refuse the prayer of such petition; and in case all the commissioners shall be in favour of granting the prayer of the petition, and shall certify the same to His Majesty, such patent or addenda, as the case may be, shall be void to all intents and purposes from the date of such certificate, and such certificate shall be filed with the clerk to the commissioners. If not unanimous, the party against whom the majority decides to have power of appeal by petition to the Lord Chancellor or to the King in council, or to the House of Lords; the appellant, with two sureties, to enter into a recognizance to the amount of   for paying costs if awarded against him, or if he abandons his appeal. Evidence before commissioners to be reduced into writing, and either party to be allowed a certified copy on paying 4d. per folio, and such sum for copy, plans, &c. as any two of the commissioners shall certify to be reasonable; no additional evidence to be allowed on appeal. The petitioner, to recall a patent, shall, on obtaining the reference to the commissioners, deposit with the clerk 200*l.* the same to be applicable to the payment of the fees of the commissioners and clerk; and in the event of the prayer of the petition being rejected, to the costs of the patentee, such to be referred to the master of the court of King's Bench for taxation, by summary application to that court; if the prayer of the petition is complied with, the costs thereof and of the reference, including the fees retained by the commissioners, &c. out of the 200*l.* to be in like manner referred to the master of the court of King's Bench, and paid by the patentee, and the balance of the 200*l.* paid back to the petitioner; the commissioners to have power to call for a further deposit, The costs, in either event, to be recoverable by attachment or action on the masters allocatur.

Do you contemplate that the patent is to be kept secret?—Certainly not; I think the balance of fraud would be on the side of secrecy; I should think that the reason they are kept secret abroad it is from a fear of other countries becoming possessed of the secret, rather than for the sake of protecting the patentee.

Do you propose that these commissioners are to judge of the correctness and propriety of granting the patent, and of the correctness of the specification, and that they are to be the court for trying the validity of the patent, when granted?—I think they should not have power to question the validity of a patent or specification, unless a caveat is entered, or subsequent petition presented to recall the letters patent; I think any person ought to be at liberty to take a patent out at his own risk, if not opposed.

You would have the commission sit in the place of the Attorney General?—Yes.

Do you propose to give the commissioners power to refuse a patent?—Only in case of opposition.

According to your plan, would you not allow any person, after the patent is once granted, to question the validity of that patent upon the merits of the case?—Yes, before the commissioners at any period; and if the commissioners were unanimous then the patent to be set aside; if they are not unanimous, then a right of appeal to be given as before proposed.

It the power were granted of adding improvements to the patent during the continuance of it, you think there ought to be the same power of questioning the right of the patentee to those improvements, as in the case of granting a patent which is new altogether?—I think there ought certainly, or else a great fraud might be practised by the patentee, stating in his original specification a portion only of his invention.

And might not a man insert the improvements of another in his own patent?—Certainly he might.

Do you not think the board of commissioners would be more efficient, if instead of being appointed for a number of years, there were a power to appoint special commissioners, or to add certain special commissioners for the purpose of trying any particular case, with which the parties to be added might be considered as particularly conversant?—Yes; but there is great difficulty in saying who is to choose. To whom am I to apply for additional commissioners, and what is to be the ground of my application; a man might say, in every case, this is not quite the thing for a scientific man, or for a mechanical man, and who is to be the judge of that?

If power is given, in the first instance, to the Treasury, or to any other office presumed to be competent to appoint a board of commissioners, why might not the same power be given to the Treasury to add special commissioners?—Because they would not then have the labour of investigating, in the first instance, every case that came before them; and a commission is an expensive commodity; they would have to take every case on its own merits. A fraud might be committed by the patentee; he might misrepresent the specification of his invention, not liking the commissioners appointed, and stating that he should wish for commissioners of a certain class; believing that the existing commissioners would not view that as an invention which he thought proper so to designate.

What are the grounds upon which you would think that such a commission ought to set aside a patent if questioned?—Want of originality; previous use and practice; misdescription.

Upon which of the grounds enumerated by Doctor Brewster, in his article upon patents, containd in his Encyclopædia, do you think that a patent ought to be set aside by such a commission as you contemplate?—I include many of these in one answer—want of originality; that the invention was in use and practice prior to the grant; or that the patent cannot be worked by the language used in the specification, not being correctly described. I would not set it aside because the specification was so worded as to imply that the party had invented that which was old at the time. The present difficulty is this, that the person acting most *bona fide*, inadvertently describes in his specification (not thinking of it at the moment) some minute part of the process as his invention, which, in point of fact, was known before, or rather omitting to state it was known before, and because he does not state that he was only claiming so and so, his patent cannot be supported at law.

Do you contemplate that the commission is to see that the specification of the invention is full and complete before the granting of the patent?—No; a man should be at liberty to specify as briefly as he pleased, and the patent should be taken as valid until petitioned against.

Would it not be desirable that as those commissioners are fully to investigate the nature of the invention, they should exercise some discretion as to the specification, and should not grant the patent unless that specification were full and complete?—That would put the patentee to an unnecessary expense; he takes out his patent, and he puts in what he chooses to consider a proper specification, all at his own individual risk; he does injury to no one.

Is not the very ground upon which a patent is granted, an exchange of benefits between the public and the inventor, by which a monopoly is given to him for a certain number of years, in return for the advantage which the public derive from knowing the nature of the invention?—Yes; but the public have the means of referring to the specification, by which they may see whether or not he has dealt fairly by them, and his patent stands or falls by the result. There would be this mischief if the commissioners acted in the way suggested by the question; they could scarcely be expected to set aside their own specification, having by its allowance in a manner concluded the question; if afterwards an application was made to set aside the patent, they, having expressed an opinion in favor of the specification, would naturally be disposed to support it.

Do you contemplate that the commissioners should be empowered to direct, in the case of chemical inventions, the institution of experiments, for the purpose of seeing whether the process for which the patent was asked was correctly described?—Certainly not; it could not be expected that the commissioners would try by actual experiment every invention for which a patent was asked; for example, with regard to Sir Humphrey Davy's safety lamp, if a patent was taken out for an improvement in it, would commissioners trust to the petitioner's belief of its safety, and go down into a mine to see whether it did or did not answer? Neither could a commissioner be expected to go down in a supposed improved diving-bell, or to go out in an improved life-boat in a storm, to ascertain if it answered the purpose intended; and safety-valves to air balloons upon a new principle may be invented; are the commissioners to make the experiment by ascending in the balloon? And so with respect to physic to be taken, and its operation to be attended to.

You have contemplated that patents should be granted either to inventors or their nominees; would it be desirable to restrict that provision to the nominees of inventors; are there not cases where the inventor may have died, in which it would be very desirable that not only the assigns, but also the heirs or representatives of the parties should be allowed to take out patents?—Certainly; what I meant by the nominee of a patentee was this, if a person brings me an invention, and says, this will answer, it is worth 2000*l.* and I buy it of him, I propose that the patent should be granted to me, my executors, administrators, and assigns, instead of to him, his executors, administrators, or assigns.

What is the policy of restricting the taking out patents to parties receiving communications from foreigners residing abroad?—I cannot see any policy in it; there is no reason why an Englishman inventing any thing abroad, and communicating it to one of his friends in this country, should not have the same benefit, and a patent issue on it, as in the case of a communication from a foreigner to the same individual.

Or an Englishman residing in England, if he does not fraudulently obtain possession of the secret?—Yes; but that could be obviated in the way I propose, by letting the patent go to the nominee of the person inventing; the patent might be taken out by the inventor or any person on his behalf.

On what terms would you give the party applying for a patent security from the moment of his application?—Upon his having sworn that he is the inventor; and that it is not in use or practice.

Would you require of him at the same time to lodge a specification of the invention?—No.

If another man should come in afterwards, how would you know that his mode was not the same, and as early invented by himself as that for which a patent had been applied for; but that he had not access to the Attorney General at the time to make his application?—The question of priority would be for the decision of the commissioners.

Would you allow a person between the application for a patent and the sealing of the patent, to make experiments, without prejudice as to the possible publication of the invention?—Yes, I would; and I should consider his patent right secure after the expiration of the first month; being the time allowed for entering caveats.

Would not there be a danger that during the remaining five months, a person might insert in his patent the inventions of another party?—There would.

Then you would allow the validity of a patent to be questioned, upon the ground of his having availed himself of the discovery of another?—Yes; and I would allow the commissioners to decide on the question of fraud.

Suppose the inventor has not fraudulently discovered the invention of another, but that a third party during the interval of those five months, has hit upon the very same discovery, would you in that case allow the patent of the applicant to be questioned?—That is a very nice question, that I could not answer off-hand satisfactorily.

What is the state of the law at present, if in the interval between the application for a patent and the sealing of it, a second party makes the very same invention that the party applying for the patent has made?—If the fact was proved on the trial of a patent, (but I do not know how it is to be done) that it was not the invention of the original patentee, of course he would lose his patent; the difficulty would be the proof of it.

It may be in use and practice secretly by another party, or it may be in use and practice openly; if in use and practice openly, it would doubtless vitiate the patent; but if in use and practice secretly, how does the law stand?—I think, as the law stands, that that would not be an use and practice. I think there was a case of some telescope that Dollond had invented, which he had kept in his own private chamber, and had only shown to a few friends, and that the court held that that was not an use and practice.

The Committee have been informed that a second party making a discovery, and using it secretly, would be allowed to continue that use for his own benefit; but that the patent of the first applicant would not on that ground be set aside, but would continue valid as regards all other parties?—I do not coincide with that opinion; I consider it not founded in law.

You propose that any petitioner opposing the grant of a patent, should be required to deposit 200*l.*; would not that operate very unequally, would not that be very large in some cases and very small in others; and would not it tend to prevent attempts to oppose patents?—Not much, because the deposit is not necessarily an ultimate payment; the party is to have it back again in case of being successful, and the patentee is to pay the opposer's costs in case his patent is successfully resisted; but it is a very small sum I have proposed should be paid on entering a caveat.

Do you propose that the party should apply to the office and make an affidavit, and remain quietly for one month, to give the chance of another party coming, and that during that month it is to be concealed; or is the affidavit to be published to the world?—I would give no further publicity to it than the filing of it, because the opposing party is not ultimately injured, except by having to deposit 200*l.*

What opportunity will the public have for opposing patents? —The same as at present; the moment they find the thing answer they will go and look at the specification.

What do you conceive to be the present state of the law, when between an application for a patent and the sealing of it a second person brings forward a similar invention to that for which a patent is claimed; are both parties in that case precluded from obtaining a patent?—I apprehend, in that case, the Attorney General would require affidavits to satisfy himself which of the two was the original inventor.

Supposing two persons came forward with the same invention, would he inquire into that fact then?—I apprehend he would.

Would not the second party bringing forward an invention to the Attorney General have to show that the thing was publicly known?—Yes, by affidavits.

Mr. Francis Abbott, again called in; and examined.

Do you think it would be advisable to print the specifications of existing patents for public use, in order to publish them?—I have generally considered it would be prejudicial to the interest of the country, by their getting abroad, I am speaking of it in a national point of view, sending many valuable discoveries abroad; many of those things perhaps would be bought from English manufacturers, but if the specifications all go abroad they would be more likely to be made there than they would be if the information was not so circulated.

Do you think that it would be advisable, that copies of the specifications should be entered in the different manufacturing counties, so as to be accessible to the public there?—Any person wanting that information, and residing near a country town where the specifications are entered, would certainly get it much cheaper if he could go and inspect it there, than by coming up to London to inspect it, or writing to somebody to procure him a copy.

You are aware that titles of patents and sometimes the specifications are published in public journals?—I am aware that there are different periodical publications that contain several of them, but not all; they have a regular list of all the patents, but they generally have a limited number only of specifications. The Philosophical Magazine used seldom to have more than two or three in a month; the Repertory I think used generally to have four in a month, and that upon the average would be about forty-eight or fifty in a year, when perhaps there have been sometimes nearly two hundred patents.

What is the expense of inspecting a specification?—At the Petty Bag Office it is three and sixpence; at the Rolls Chapel Office it is three and sixpence; at the Inrolment Office it is a shilling; they have none but modern ones there, for when they have got ten or fifteen years they hand them over to the Rolls Chapel Office, so that they never have more than that limited number in their possession at that office.

Supposing a person is desirous of inspecting a specification, has he any means of knowing which office it will be found in? —No, I think it is a great grievance that he has not; he sometimes has to pay for searches at two or three before he finds it.

Would it not be much more convenient to have them all in one office?—Indisputably so.

Do all specifications, that are considered of any importance, find their way into the public journals?—I do not think the importance altogether regulates that, it is a matter of convenience which the publisher considers; sometimes they want a long one because they have a scarcity of matter, perhaps at other times a short one is more convenient; and they frequently do not take those with drawings because they then save the expense of plates.

Is not influence sometimes used with the editors of the journals, to induce them not to publish specifications which the inventors wish to keep secret?—I have no doubt that is sometimes the case.

When a person has inrolled his specification, what becomes of the copy, that is to say the original deed ?—It is delivered back to the solicitor or the agent who brings it for inrolment.

And the copy of that specification is what you keep in the office ?—The inrolment of it.

Is that original deed, which is returned to the inventor, good evidence in a court of law ?—No.

Supposing a trial in a court of law in which it is necessary to give in evidence a specification which has been inrolled, is that copy which has been given to the party good evidence of that specification, or is it necessary to obtain either the original roll or an office copy of it ?—The production of the specification is not good evidence of it. The proper evidence is an office copy; or in many instances, in London, we used to attend with the originals, as less expensive to the parties ; but Sir John Leach has lately laid down a rule, that he will not suffer the original rolls of the court to be taken out when office copies are admissible evidence ; office copies are admissible evidence upon trials.

Are they admissible evidence without calling the copyer or the officer of the Inrolment Office as witnesses, to prove the authenticity of the copy ?—Some person must come to the office and examine the copy with the original record, and then he must attend at the trial and say, This is a true copy of the record in the Petty Bag Office, or in the Inrolment Office, as it may be.

Is the simple indorsement upon that copy made at the Inrolment Office, received as evidence on the trial of the authenticity, as is the case with the indorsement on a deed, when it comes from the Register Office of Middlesex ?—The certificate of the officer is not evidence either of inrolment or of the authenticity.

Would it not save expense upon the trial if the indorsement made at the office were received as proof of the authenticity of the copy ?—Certainly ; and that principle has been adopted in another court, where, to save the expense of that mode of giving evidence, an act of parliament has been passed, directing that any certificate, purporting to be signed by the officer in whose custody the document is, shall be evidence of itself, without proving his signature to it.

Is the inventor allowed to take his original specification and verify it, by comparing it with the inrolled copy previous to trial ?—The original specification is not then evidence ; it must be an office copy examined with the record.

Would it not be a great saving of expense to the parties, if they might take the original specification and compare it with the inrolled specification, and then give it in evidence ?—It would certainly be a saving of expense to a patentee who was litigating his rights.

The saving would be in avoiding the expense of a new copy ?—Yes ; and that sometimes is a very serious expense ; sometimes they are very long. I have had several specifications in the Petty Bag Office, copies of which would come to forty pounds, or sometimes more than that ; there is such an immensity of drawings attached to them ; I think I have had some twenty or thirty skins of descriptive matter, and perhaps fifteen or twenty skins of drawings attached.

Even in such a case, would not a new comparison of the original copy with the inrolled copy be necessary, in order to see that no interpolations had taken place ?—I should think it would be proper, or else some alteration might be made that would be an obstruction to justice, if it was not proved that in its present state it has been examined with the record, and that it agrees with it.

Would it not be beneficial, if instead of returning the specification to the party, it was retained in some office, so as to be capable of being produced on the trial if it was wanted ?—Then there would be an expense if it was to remain with the officer ; that officer would have to attend to it, and it would come to the same expense, perhaps, as the production of the specification, and in some instances that is more than a copy ; because there are some specifications that we have a copy of which would not cost above a dozen or fourteen shillings, and the officer's fee for attending with it would be a guinea a day, exclusive of a petition presented to the Master of the Rolls for liberty to take out the record. If I am to understand that it is to remain with the officer as a record, it must be dealt with as other records are.

Would the expense in that case of attending with the original specification, be much greater than is incurred now of a clerk attending with the copy ?—The attorney sends his own clerk ; we do not attend to authenticate the copy ; we make the copy, and the attorney sends his own clerk ; or if it be a subject that requires scientific information, such as where there are drawings and shading and scales, and so on, he will send an engineer to examine it ; but there are some specifications which do not cost more than ten shillings, or a dozen shillings ; then an office copy is much less expensive than producing this record ; which I understand is to be considered as deposited of record, instead of being inrolled of record.

The ancient practice of producing the original record was inconvenient, was not it ?—I think it was dangerous, and ought never to be resorted to, except in cases of indispensible necessity ; in the case of criminal prosecutions, office copies are not admitted in evidence, and the originals must go ; also before either House of Parliament or any Committee, they do not receive office copies except as a matter of courtesy: sometimes the original is dispensed with; but generally speaking, either House of Parliament, and any Committee of either House, has the original records.

Do you think it would answer to leave it optional with the party to return the specification or not, so that if it was a very long one he might then leave it and let it be of record?—Unless the rule was general, I am not quite prepared to say, whether it would have the benefit that might otherwise result from it if it was general; because if it is to be a general depository, people would always expect to find a specification there, and going there and not finding it, would be attended with expense in pursuit of it.

Do you see any objection to allowing the patentee to take his original specification, and verify it at the office, so as to make it good evidence in a court of law?—No, I do not see any objection to it; it is pretty nearly what I believe has been done in another case under the Bankrupt Act. There are certain deeds of bargain and sale and assignment of personal property, they are directed to be registered; which is in substance inrolling them; and under that Act it is provided that they shall be received in evidence, bearing a certificate purporting to be signed by the officer that they have been registered, without even proving that officer's signature; if it purports to be his, and that is certainly a very beneficial provision, it saves a great deal of expense.

You mentioned that there are very large drawings sometimes attached to a specification, is not the present mode of keeping the rolls rolled up, a little inconvenient with respect to drawings?—Speaking of the mode of keeping them, as a whole, I think it is the best way.

Would you think it an improvement to have them in books?—I think not; they are better preserved, I think, in their present form than in books, for you can seldom get books to stand long without binding, when they are in constant use. We have some books in the office and some rolls, and I think the rolls bear the wear of use better than the books do.

Do you allow extracts of specifications to be made?—No; as a kind of gratuitous privilege, we say, No extracts are allowed; but just to refresh your memory with the outline, we do not object to your taking the name and address of the patentee, the date of the patent, and the title of the invention; but not any extracts of the descriptive part. In short, it would be productive of great inconvenience, independently of the loss of emolument to the office, if extracts were allowed; we could

Then in point of fact, an agent in the habit of taking out patents can, unless he was particularly unfriendly with the different clerks, be able to obtain such information?—I have never been refused it when I have asked it.

Have you had any practice in obtaining extensions of patents by Act of Parliament?—No.

Have you had any experience in defending patents?—I have had some experience in endeavouring to protect a patentee; but unfortunately, after a long contest, he failed, after trying the cause two or three times at an immense expense.

Can you state what are the most common grounds of defence which are set up by infringers of patents?—They are various, but mostly the insufficiency of the specification; and there is such a wide field, that it is difficult almost to enumerate all the grounds that they take upon the specification.

Is not this one of the grounds upon which a patent is often set aside, that the inventor specifies one material and uses a cheaper material not specified or included in the patent?—That has been acted upon as one ground for vacating a patent.

Has that ground of objection been held valid?—I think so.

Must not the specification have been fraudulently prepared?—I remember a case which is a reported case, but I own I thought it was very likely to have arisen by accident.

If, subsequently to the specification of the patent, a person has *bona fide* discovered a cheaper mode, would that set aside the patent?—Certainly not; the person who has discovered the cheaper mode, would be entitled to use that without a patent, provided he could do it without the original patent to work upon.

Must not the ground of setting aside the patent be, that the person at the time of taking out the specification knew the cheaper method and omitted to specify it?—I am not aware that that precise case has arisen, but I should think that would vacate his patent; from the current of decisions that have taken place, I think it would be presumed that his object was to mislead the public in keeping that secret back.

Is not another ground of setting aside a specification, that some beneficial part of the process is omitted?—That certainly is one, and I think a very just ground.

Do you conceive that that could ever happen inadvertently?—I think it is difficult to suppose such a thing, I think that is a very proper ground to vacate a patent upon.

Is that rule construed liberally or strictly by the courts?—Generally speaking, I should say that the courts are not very liberal to patentees.

Is not another ground of setting aside a patent, that something useless, superfluous, or redundant, has been included in the specification?—That has been a question that has been left to a jury, with a direction to take into their consideration whether it was not introduced to mistify the thing.

If it is considered that the real object has been to mystify, do you think that would be a good ground for setting aside the patent?—If I was sittting as a juryman I should, certainly, because I think a patentee should deal honestly in return for the privileges he gains by his patent.

Is a patentee ever allowed to give evidence, to show that any omission in his specification arose from inadvertence?—I think not.

Is not the specification very seldom prepared by the inventor himself; does not he frequently employ his agent to do it?—He frequently employs an agent; but in a matter of importance. he frequently employs such a man as Mr. Farey or Mr. Donkin.

Supposing it should be found that the specification has been inaccurately prepared by one of those persons, would the inventor be allowed to give evidence of his having desired him to prepare as good and correct a specification as could be made? —I think that would not avail him.

Is not another ground of setting aside a patent, that something has been specified which will not produce the predicted effect?—That is a clear ground for vacating it.

If a part only of the patent were thus shown not to produce its effect, would that part vitiate the whole?—It would; that was the unfortunate result of the trial that I was engaged in so long, and at such an enormous expense; the patent was for three things, one of them a most valuable one; but the patentee failed in one of them; two of them were found good, but the third was the most immaterial part of the three; and he was held not entitled to recover, because one of the three objects was not new.

Would it set aside the patent, if the person had included something in the specification, of which he had not tried the effect?—He puts it in at his peril; but if it would produce the effect, it would not vacate the patent.

Is not another ground of setting aside a patent, the specifying some step that is not new, and not noting that fact, whereby the patentee was held to have assumed what he did not invent?—I believe there have been cases which have gone that length, but I think, at this time of day, the law would not be carried to that extent.

Do you think, if it was a minor point of little importance, the patent would still stand?—I can only say, that in some points of minor description, patentees are now dealt with a little more liberally than they were some twenty or thirty years ago; in Lord Kenyon's time every little thing would set aside a patent.

Is not another ground of setting aside a patent, that the whole article is specified as invented, when the patent should have been for an improvement only?—I should doubt that position a little; if the specification described an implement that would work and perform its office, I think at this day, merely because he had called it a new article instead of an improved article, the patent would not be vacated on that ground merely.

Supposing, in a specification, you had to mention a portion of your process, which was old, and that you failed to do it completely, so as to be quite understood, that you did not claim it as a portion of your patent, would that not vitiate it? —I think it would; if a man so amalgamates with his new invention that which is old, and does not distinguish the two, he claims more than he is entitled to, and forfeits his patent,

Would it not be desirable that a man should be compelled to make known to the public any improvements that he might make to his invention, subsequently to taking out the patent? —Not unless, he was protected in the exclusive use of them; that he can do by taking out a patent for improvements upon his former invention.

He could only do that by incurring the expense of a fresh patent?—Certainly.

Do you see any advantage at present from requiring a separate patent for each of the three kingdoms?—I not only see no advantage, but I think it is putting the inventor to a very great and unnecessary expense. But if the law were altered so that his patent should embrace the three parts of the United Kingdom, he should inrol his specification at each, although he has but one patent, at Edinburgh, Dublin, and London, as he is now obliged to do.

Supposing a patentee takes out a patent for England, he is only now subject to a certain expense; if he takes it out for Ireland and Scotland the expense is greatly enhanced; now if one patent was to be made to extend to the three kingdoms, would you require from the patentee the same payment for the one patent that he would have to make now in the event of his taking out a patent for the three kingdoms?—A man ought not to pay so much certainly for taking out a patent confined to a limited jurisdiction as if it extended to the whole; I assume, that if the three kingdoms were to be consolidated, and one patent was to be sufficient, that the expense would be considerably reduced, and that he would only have, perhaps, to pay for that more extensive patent what he pays now for an English patent only.

Then you would propose to reduce the expense?—By consolidating the jurisdictions; but then this difficulty would come round, how is it to be legally known in Scotland and in Ire land that there is such a patent right there; I do not see how there could be official notice of it, unless it was to be put into the Gazette, or something of that sort.

Do you think that, practically, many persons are deterred from defending their patents, by the uncertainty of the law at present?—I think they are.

Are you aware at all, that sometimes fictitious suits are instituted for the sake of giving stability to a patent?—I have heard of that being done in more cases than one.

Is it not a very common feeling, that a patent is of very little value until it has had at least one verdict in its favour?—I should say, that that gave it a little additional sanction; but I have not heard it specifically objected to a patent, that it has not been tried; for a scientific man can give you pretty good information upon the specification, if you let him have time to consider it.

But those fictitious suits have been instituted for the sake of giving greater value to the patent?—Certainly, perhaps, to deter some one else from defending it, who otherwise would have defended an action for infringing it.

Could you furnish the Committee with a detailed account of the whole expense of taking out a patent?—Certainly I will do so.

Do you conceive, that any injury could arise to the pulic, from the specification, after the patent is sealed, being kept unsealed entirely, unless at the option of the patentee himself, who might chuse to take it out for the purpose of defence in a court of justice?—I think inconvenience would result from that mode, because it is one object of the specification that a man shall know when he is infringing the patent; and if the specification is not open to inspection, a man who has invented something of the same kind, does not know whether he can work it with safety, because he cannot see what the patentee claims under the specification.

Are you aware of any inconvenience arising from that in France?—I have uniformly declined to have any thing to do with French patents, because I have conversed with several people about it, and I never found one yet that derived so much fruit from a French patent as to remunerate him for it.

You said, that the disadvantage of concealing the specification would be, that other persons might infringe the patent without knowing it; would not that at once be practically remedied, by the patentee giving notice of it to the person who was so innocently infringing his patent?—All that I can say is, that as soon as a man infringes a patent, he is liable to an action, and it is not every patentee that would use that forbearance when his patent is infringed.

It is assumed that under the different state of circumstances supposed in the question, he would not be infringing it, because the law would be changed?—That would lessen the inconvenience; but there is another inconvenience resulting from it. If this specification could not be seen for fourteen years, it would very likely turn out, that at the end of the fourteen years he had not given half his process, unless it was ascertained that he had given it fully, then he would have had his monopoly for so many years without giving the public the benefit of his discovery; at the end of that time if he has got his patent, and his specification is locked up, nobody can say that he has not disclosed it fairly, because nobody can see what the specification is.

Have you any further suggestions to offer to the Committee upon this subject?—Since I was examined before, I have thought about the expediency of having a board to decide the sufficiency of a specification, and I think it might be injurious because the public are not fairly represented there, and they are to be concluded by it; because if this board adopts a specification as sufficient, I understand it is to be conclusive against any person questioning the sufficiency afterwards. Now a patentee coming before that board, may not disclose all he knows of the subject, or if he discloses all, yet he may not disclose all that others could have said if the public had been represented, if a kind of investigation for and against had taken place.

Suppose that the proposed commission were authorized, either to have models made of the machinery, or in the case of a chemical discovery, to see the thing actually made by experiments; would not that obviate the objection?—The difficulty I feel is, in finding any body of gentlemen possessed of powers to determine upon every new invention that must come before them for consideration.

Is your objection that you do not think any permanent board could be qualified for the duties that would necessarily be attached to it?—I think not.

Supposing a body of Commissioners were appointed for the occasion, selected for their peculiar fitness; might not that obviate your objection?—If one part of the board were to be confined to one subject of invention, and another to another, that might in some measure obviate the difficulty; but still I think the difficulty would not be quite removed, for I think there are many new inventions that almost none of our scientific men are capable of forming a correct judgment upon, otherwise than as it is communicated to them in a great degree by the patentee. It is difficult in my opinion to get a board so constituted, as that they would be able to discharge all the duties devolving upon them. The difficulty is, that you would not find men capable of discriminating minutely upon every branch of art or science that should be brought before them.

Supposing the Attorney General or the Secretary of State had the power of selecting individuals *pro re nata*, might not a commission of that sort be useful?—I am hardly competent to answer that question; I must honestly confess that my opinion is against the adoption of such a board. Independently of which, the public who are to be concluded by it, would not be adequately represented there, for you do not always arrive at the whole truth without opposition, if I may so express myself, now there would not be that opposition.

Does it occur to you, that even very experienced men might overlook some part of a minute operation?—I think so, and that is one difficulty which I have.

Do you ever observe in specifications that things are put into the specification for the purpose of concealment, which are not necessary for the due performance of the operation?—I have no doubt that there is a great deal put into many specifications to mistify them, to obscure the transaction as much as possible; and I could furnish an instance in which it has made my head ache, to endeavour to make out the sense that we supposed was to be communicated by it, there was such a multiplication of terms, and ringing the changes upon words, which perplexed and bewildered me beyond measure,

Are there not sometimes parts of machinery inserted as necessary, which are not necessary; and are not parts of a chemical operation stated as necessary, which are not so?—That a great deal of matter is introduced into specifications, that is unnecessary is quite clear; and it is done frequently with a view to mistify it, to enable the patentee to keep his invention from the public; but I must add, that in many instances, that which is new cannot be adequately described, unless you also describe something that is to be used with it; in that case the man ought to describe what he has inserted for the purpose of elucidation.

Are there not things occasionally put in that are known to be useless, for the purpose of mistification?—I have no doubt of it.

New Patents Sealed in 1830.

To William Hale, of Colchester, in the county of Essex, machinest, for his having invented a machine, or method of raising or forcing water for propelling vessels. Sealed 12th. Jan.—6 months.

To James Carpenter, of Willenhall, in the parish of Wolverhampton, in the county of Stafford, and John Young, of Wolverhampton aforesaid, locksmiths, for their having invented certain improvements on locks and other securities, applicable to doors and other purposes. 18th Jan.—6 months.

To William Parr, of Union Place, City Road, in the county of Middlesex, gentleman, for his having invented or found out a new method of producing a reciprocating action, by means of rotatory motion; to be applied to the working of all kinds of pumps, mangles, and all other machinery in, or to which reciprocating action is required, or may be applied. 18th Jan.—4 months.

To Edward Dakeyne and James Dakeyne, both of Darley Dale, in the county of Derby, merchants, for their having invented a machine or hydraulic engine, for applying the power or pressure of water, steam, and other elastic fluids, to the purpose of working machinery and other uses, requiring power; and applicable to that of raising or forcing of fluids. 21st Jan.—6 months.

To John Yates, of Hyde, in the county of Chester, calico-printer, for his having invented a method or process of giving a metallic surface to cotton, silk, linen, and other fabrics. 26th Jan.—6 months.

METEROLOGICAL JOURNAL, FROM NOV. 1829 TO JAN. 1830.

1829.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low	High.	Low.	
Nov.					
26	40	29	29,81	29,76	,2
27	39	30	29,75	29,59	,25
28	43	39	29,69	29,59	0,75
29	45	40	29,76	29,69	
30	45	35	29,78	29,76	
Dec.					
1	42	35	29,76	Stat.	
2	44	35	29,70	Stat.	
3	45	37	29,76	29,72	
4	48	36	29,86	29,76	
5	51	38	30,16	30,06	
6	40	35	30,41	Stat.	
7	35	21	30,30	30,15	
8	35	33	30,15	30,10	
9	37	26	30,26	30,03	
10	37	25	30,08	30,06	
11	39	22	30,06	Stat.	
12	44	25	30,09	Stat.	
13	48	32	30,14	30,09	
14	37	25	30,26	30,20	
15	39	24	30,24	Stat.	,025
16	38	28	30,18	30,12	,125
17	38	29	29,94	29,92	
18	37	24	29,72	29,58	
19	37	28	29,73	Stat.	
20	33	26	29,84	29,73	
21	33	19	29,84	Stat.	
22	37	18	29,71	29,66	
23	29	25	29,71	29,60	
24	29	21	29,80	29,64	
25	34	26	29,96	Stat.	
26	28	22	30, 30	30,24	
27	29	18	30,22	Stat.	
28	35	11	30,21	30,10	
29	26	18	30,26	30,15	
30	30		,35	30,30	
31	33	24	30,43	30,35	

1830.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low	Hig.	Low.	
Jan.					
1	36	24	30,52	Stat.	
2	33	25	30,40	30,42	
3	37	28	30,36	30,32	
4	38	30	30,21	30,17	
5	41	34	30,21	30,15	
6	37	21,5	30,25	30,06	
7	43	29	29,84	29,75	
8	37	29	30,06	29,98	
9	40	26	30,06	29,89	
10	37	29	29,76	29,73	
11	37	29	29,66	29,56	
12	31	26	29,89	29,72	
13	31,5	25	29,86	29,71	
14	30	17	29,85	29,78	
15	35	25	29,86	29,83	
16	33	24	29,87	29,83	
17	23	15	29,90	29,84	
18	23	5	29,90	29,83	
19	26	6,5	29,71	29,44	
20	35	20	29,79	29,59	,5
21	36	25	29,45	29,26	1,75
22	35	31	29.68	29,53	,1
23	35	27	29,84	29,79	
24	39	30	29,96	29,81	
25	37	27	30,25	30,14	,025

Edmonton.

C. H. ADAMS.

CELESTIAL PHENOMENA, for February, 1830.

D.	H.	M.	S.	
1	0	0	0	Clock before the ☉ 13 *m* 57 Sec.
1	14	0	0	☽ in conj. with γ in Taurus
1	15	0	0	☽ in conj. with 1 δ in Taurus
1	16	0	0	☽ in conj. with 2 δ in Taurus
1	21	0	0	☽ in conj. with α in Taurus.
2	0	0	0	☿ stationary
5	0	0	0	Clock before the ☉ 14 *m* 22 Sec.
7	7	42	0	Ecliptic opposition, or ○ full moon.
7	9	0	0	☾ in conj. with ξ in Leo.
9	19	0	0	☾ in conj. with τ in Leo.
10	0	0	0	Clock before the ☉ 14 *m* 35 Sec.
10	0	0	0	♂ in conj. with *B* in Oph.
10	7	0	0	☾ in conj. with β in Virgo.
10	23	0	0	☾ in conj. with η in Virgo.
12	1	0	0	☾ in conj. with ϑ in Virgo
13	10	0	0	☾ in conj. with κ in Virgo.
14	0	0	0	♀ stationary
15	0	0	0	Clock before the ☉ 14 *m* 29 Sec.
15	4	0	0	☾ in conj. with γ in Libra
15	12	28	0	☾ in □ last quarter.
16	7	0	0	☾ in conj. with φ in Oph.
18	14	21	0	☉ enters Pisces
19	13	33	0	♃ in conj. with 1 ν in Sagitt.
20	0	0	0	Clock before the ☉ 14 *m* 5 Sec.
20	11	0	0	in conj. with 2 β in Capri.
21	9	0	0	☾ in conj. with ☿ Long. 14½ in Capri. ☾ Lat. 3° N' ☿ Lat. 3° N' Diff. Lat. ○
22	0	0	0	☉ eclipsed, invisible.
22	16	36	0	Eclipt. conj. or ● new moon
24	0	0	0	♀ stationary.
25	0	0	0	Clock before the ☉ 13 *m* 2 Sec.
28	19	0	0	☽ in conj. with γ in Taurus,
28	21	0	0	☽ in conj. with 1 δ in Taurus
28	21	0	0	☽ in conj. with 2 δ in Taurus

☽ the waxing moon.—☾ the waning moon

Rotherhithe. J LEWTHWAITE.

N.B. An error has occurred in numbering the pages following 288 to 232; but the subject proceeds without interruption.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. XXIV.

[SECOND SERIES.]

Recent Patents.

To GEORGE SCHOLEFILD, *of the Parish of Leeds, in the county of York, Mechanic, for his Invention of certain Improvements in, or additions to Looms, for the purpose of weaving woollen, linen, cotton, silk, and other Cloths.*—[Sealed 13th March, 1828.]

THE improvement suggested under this Patent are certain mechanical contrivances, which connect all the operating parts of a loom together, and cause them to act simultaneously whenever motion is given to the loom, either by swinging the batten by hand, as is the ordinary mode of weaving, or by turning a main actuating shaft. The advantages of these contrivances are that any person, even without previous experience or knowledge of the art, can weave woollen cloths with facility, and that the movements of the different parts of the machine being calculated and (previous to being put in action) adjusted to suit certain descriptions of work, the movements will necessarily all perform with regularity, and answer to each other, producing uniform and good work as long as the loom is kept going.

And further, these mechanical contrivances being thus made to act simultaneously, allow of working such looms by power, that is by the power of steam, water or any other first mover, by connecting the driving band or gear to a main rotatory shaft, when the working parts of the loom will perform without manual labour.

Plate XIII, figs. 1, and 2, represent the machine in working order; fig. 1, being a front view; fig. 2, an end view. We give the description ot this invention in the words of the Patentee.

SPECIFICATION.

" *A*, is the frame work of the machine, made of cast iron; *B*, the batten, which is made of wood, and constructed in the usual way with the addition of the weights *C*, adjustable on the levers *a*, for the purpose of giving more or less effect to the reeds. The levers *a*, are firmly fixed through the top of the batten, and the said weights operate more or less powerful in proportion to their distance from the batten; *b*, *b*, are the fulcrums, on which the batten is suspended, working with chisel edges in grooves on the top of the screws *c*; the said screws having a nut on the upper and under side of the frame, which are adjustable in chase mortices; *D*, is a roller, which delivers or measures out the warp; *E*, is a pressure roller suspended by the levers *d*, and the weights *e*; thus giving a considerable pressure between the roller *D*, and *E*. These said rollers are covered with a coarse kind of woollen cloth, in order to render the surfaces somewhat elastic: *F*, is the roller which contains the warp. This roller is frictioned in a slight degree by the cord and weight *f*, and is sufficiently retarded to keep the warp straight between the rollers *E*, and *F*; *G*, is the breast beam, over which the cloth passes to the roller *H*, which takes it up as it is woven, being put in motion by the strap *g*, from the action of the delivering roller, *D*; *h*, is a wrought iron bar bolt, which screws the frame *A*, together.

" The levers or jacks *i*, *i*, are suspended in the top bar of the cast iron frame *A*, *A*, with double hanging flanges on the bottom, on which rest the fulcrums of the levers. These fulcrums may be shifted to the most convenient points of suspension in the frame *A*, *A*; fig. 4, is a transverse section of the frame *A*, *A*.

" The heddles or gears *I*, are attached with cords to the jacks in the usual way. The lower ends of the heddles are also fixed to the levers or lams *k*, in the usual way, and to the lams are attached the treadles. Above the treadles and within the frame is placed a horizontal shaft *m*, shewn by the dotted lines in fig. 1, behind the frame *A*. This shaft extends a little beyond the centre of the loom, and is there supported by an eye-bolt, which is fixed in the frame *A*, at 1. The other bearing of this shaft is in the end of the frame at *n*; on the end of the shaft *m*, is fixed an endless screw or worm *n*, which works in the wheel *o*; at the lower end of the diagonal shaft *p*; on the upper end of which is a pinion of sixteen teeth, working in the bevel wheel *K*, which contains two hundred teeth, and is fixed to the end of the delivering roller *D*.

" As it is necessary to have wheels of different sizes at *o*, according to the quality of the cloth made, the diagonal shaft *p*, is supported by a cast iron frame running parallel with it, the upper end of which encompasses the gudgeon of the delivery roller *D*; and at the lower end is a projection *h*, in which is a slot and setting screw at fig. 4, for the purpose of raising or lowering the diagonal shaft, to compensate for the different sizes of the worm wheels *o*; which must contain as many teeth as there are threads of weft wanted in one inch of cloth; that is a wheel of 60 teeth gives 60 threads per inch; a wheel of 20 teeth 20 threads, &c. &c.

"I have all my speed wheels marked with the number of teeth they contain on the shaft *m*; and exactly in the centre of the loom is a hollow pulley, or catch box *q*, the construction of which is seen at fig. 3. The interior part 2, contains two teeth or stops, and is fixed firmly to the shaft *m*; the exterior part of the pulley which holds the falling catch and spring 3, is made to run loose on the shaft *m*; from this it will be seen that the shaft *m*, can only be propelled in the direction of the dart, the pulley being loose in the reverse direction.

"On the horizontal shaft *m*, are fixed in opposite directions, two tumblers *r*, one on each side of the catch box, the rims of which work in grooves made in the friction pulleys *s*, and the friction pulleys are suspended in the treadles.

"To the inside of the breast beam *G*, and in the middle of its length is fixed the iron frame *L*, supporting a small wooden pulley at *t*. To the bottom of the batten at *u*, is fixed a leather strap *v*, of one inch breadth, which passes over the pulley *t*, and is made fast to the hollow pulley *q*.

"A coiled wire spring *w*, is fixed to the end of the frame *L*, at *t*, and to the lower end of this spring is attached a cord, which connects it to the hollow pulley on the opposite side, and direction to that on which the strap *v*, is fixed. To the ends of the lams *k*, are fixed the rods *x*, which extend upwards to the levers *y*, seen at fig. 2. These levers are adjustable by the chase mortices in the frame *A*, (which bears their fulcrums), and the screws which are seen at the bottom of the rods. The right angled levers *z*, are fixed to the sides of the batten, one arm of which passes through the batten and enters the ends of the levers *M*, at 5 the fulcrums of the levers *M*, are at 6; *Z, Z*, are rotative self-acting temples; in the circumference of which, and near the lower edge, is a number of metal points projecting outward. The temples are mounted on arbours fixed with screw bolts to the breast beam *G*; the bolt holes are elongated to admit of adjustment. A bent wire is fixed at 7 to conduct the lists or edges of the cloth to the metal points.

" A catch lever is placed at 8, which acts alternately against the two projections of a plate which is fixed on the shaft *m*, to prevent the vibrating force moving the eccentrics too far. It is delivered by the bottom and small cord to which it is attached."

" The above is a description of my loom, for the purpose of weaving by hand; as a power loom I have a further improvement, namely, that of stopping the loom when any one of the threads of weft break, or when the bobbin is empty.

" The power looms now in use have a well known method of stopping when the shuttle does not arrive at its destination; or when it does not enter the box. My plan, therefore, prevents the shuttle boxing when the thread is broke, or when the bobbin wants replenishing. It is done as follows: in the back part of the shuttle, and between the end of the bobbin and the pulley, or wire, over which the thread passes to the eye of the shuttle, is placed a small right angled lever, supported at the angular point in the side of the shuttle, one arm of the lever hanging downward. The horizontal arm of the lever has, in the extreme end of it, an eye through which the thread of weft passes: so long as the thread continues whole the tightness of it keeps the lever in its square position; but the moment it breaks it becomes slack, letting the horizontal arm of the lever (which is supported by the thread) fall, consequently forcing the lower end of the lever out of the shuttle, which has an opening made in it for that purpose. This lever projecting outwards catches a stop at the end of the reed, which stop arrests its progress.

"As the weft is always slack on the return of the shuttle from the box, the stops in the ends of the reeds are wedge-wise, so that they can only act upon the lever in the shuttle when it is entering the box, and not on its return from the box.

"I apply steam to woollen or worsted warps, or such other warps as require moisture during the operation of weaving, which is conveyed to the threads by a copper tube, finely perforated and placed across the loom under the warp and near to the treadles.

"I weave two or more narrow pieces in one loom at the same time, and with the same number of shuttles as pieces; the only difference to the one explained is, that an extra shuttle box is placed in the middle of the batten, (when for two pieces) as also a lever for throwing the shuttle, which lever has a double action, namely, that of throwing right and left; the pieces must both be of the same quality.

"In order to put the machine in operation (which is done by the motion of the batten) let the batten be in the direction of the crossed lines, fig. 2. that is with the reed or slay against the cloth; the shed or warp is then open ready to admit the passing of the shuttle. On the batten being forced backward the upper end of the lever *z*, comes in contact with the lever *y*, (which at that time is stationary); the lower end of the lever *z*, consequently receives a downward motion, carrying with it the short end of the lever *M*, at 5, thus a rapid ponderous motion is given to the lower end of the lever *M*, and to it is attached the pricker, which propels the shuttle across the warp with considerable force; and as the other lever *y*, at the left hand of the loom is kept clear of the lever *z*, by the motion of the lam *k*, the shuttle enters the box without opposition, save that of a flat spring, which prevents its rebounding."

" On the motion of the batten towards the cloth, the strap *v*, turns the shaft *m*, half way, which, carrying the eccentrics, changes the treadles, and with them the posisition of the two levers *y*, (which operate upon the levers *M*, for throwing the shuttle). At the same time the endless screw, which is on the end of the shaft *m*, turns the worm-wheel *o*, and delivers out a portion of the warp from the roller *D*, which being connected to the roller *H*, by the strap *g*, a portion of the piece of cloth lately woven is also taken up.

" The use of the spring *w*, is to bring the exterior part of the hollow pulley back (after it has gone half way round) to its former position. On the motion of the batten towards the cloth, the hollow pulley *q*, is fast, consequently it moved the shaft *m*; on the reverse motion of the batten the pulley *q*, is loose, and is drawn back by the spring *w*, until the catch 3, in the pulley falls over one of the stops in the interior part of the pulley 2, when it is again ready to move the shaft *m*, forward.

" As many blows can be given with the batten to one thread of weft as are required, without delivering the warp. Two portions of warp cannot be delivered to one thread of weft; the shuttle must pass through the shed before the warp can be delivered a second time, neither will the shuttle travel unless it has its proper shed; that is, two threads of weft cannot be laid in the same place. Thus, the oscillation of the batten gives a rotatory motion to the horizontal shaft *m*, and works all the other parts of the loom with the utmost mechanical precision.

" The advantages of my looms are—1st, Any person may work them, they only requiring the batten being put backward and forward with the hand—2nd, The cloth made by them is of the most even texture, the same number of threads being put into every inch—3rd, The length of the shed and motion of the batten is always the same—4th, The temples are always at the required distance from the reed—5th, When a master or foreman has affixed a proper speed wheel at *o*, the workman is compelled to make a good piece—6th, The most perfect work may be done by them in a cottage by hand, or power of steam or water, and may be immediately applied to them in a mill, by passing a drum band over the rigger 14—7th, All looms now in use can be altered to the above plans at a trifling expense.

"I claim as my own invention—1st, The method of putting the same given number of threads of weft into every inch of cloth—2nd, The construction and application of the self-acting rotatory temples—3rd, The method of weaving two or more cloths in the same loom at the same time, and with perfect edges or lists—4th, The application of all the working parts of a common loom to the motion of the batten only—5th, The application of steam to all such warps as require moisture during the operation."—[*Inrolled in the Inrolment Office, Sept.* 1828.]

Specification drawn by the Patentee.

To William Godfrey Kneller, *of Pearl Street, Spitalfields, in the county of Middlesex, Chemist, for his invention of certain Improvements in evaporating Sugar; which improvements are applicable to other purposes.*—[Sealed November 27, 1828.]

The object of the Patentee is to evaporate liquid, and solutions at a low temperature, in order to avoid the injury frequently sustained by the coagulated parts in boiling becoming burned to the bottom of the vessel. This is particularly necessary in evaporating the molasses to obtain sugar, the crystals of which adhere to the boiler, and if the temperature is sufficiently high, they become burned, to the injury of the sugar in its quality, colour and taste.

The improvement proposed under this Patent consists in forcing by bellows, or any other blowing apparatus, currents of either hot or cold air through the liquid under operation. This is proposed to be done by means of a series of small pipes or tubes, branching from a main tube, and projecting into the liquid nearly to the bottom of the vessel in which it is put under operation, the main tube being connected to the blowing apparatus. The pan or boiler containing the liquid, may be of any convenient shape, and heated by steam or hot air in any of the usual modes.

In Plate XIV. figs. 3, 4, and 5, one method of using this invention for the purpose of evaporating liquids or solutions is shewn; fig. 3, is a plan or horizontal view of the apparatus; fig. 4, is a longitudinal section, shewing the tubes, boiler and furnace; fig. 5, is a cross section of the same; *a, a, a,* is the pan or boiler, which is filled with the liquid up to the dotted line in figs. 4, and 5; *b,* is the boiler for generating steam, and which surrounds the pan *a*; *c,* is the furnace; *d,* is the main air tube leading from the blowing apparatus to the branch main pipes *e, e, e,* which are closed at their ends; from these tubes the small branch tubes *f, f, f, f,* project into the liquid, having their extremities open for the purpose of allowing the air forced from the blowing apparatus to be disseminated throughout the whole of the liquid; *g, g,* are legs which support the branch main tubes and pipes, and rest on the bottom of the pan or boiler, and are of such a length as will prevent the ends of the small branch pipes *f, f, f, f,* from touching the bottom of the pan, and may be made so as to regulate the depth the small tubes shall protrude into the liquid. It is desirable that the liquid to be evaporated should be of equal depth in every part of the pan, the bottom of which is recommended to be perfectly level. As the liquid, when sufficiently evaporated and concentrated, does not flow readily from the pan through the pipe *h*, when opened for that purpose, a vertical plate or scraper *i*, extending across the pan, is to be drawn by a chain or wire along the pan towards the pipe *h*. When this is wished to be done, the fire is to be damped, or the steam or hot air shut off, and the whole series of pipes and tubes raised from their present position by a chain and winch or lever, until the scraper can pass freely under them, and so as not to interrupt the blast of air through the small pipes, which might be obstructed if any of the evaporated liquid should congeal or crystalize in them by cooling. To effect this, the main pipe *d*, must be made with an air-tight telescopic joint, or may have a flexible tube attached to it, so as to allow of the pipes and tubes being raised about six inches.

By raising the degree of heat under the pan or boiler, and increasing the quantity and velocity of the air injected into the liquid or solution, or on the contrary by lowering the heat and moderating the injection of air, the evaporation is accelerated or retarded at the pleasure of the operator, according to the nature of the liquids, &c., or as to the effect desired to be produced. This invention is also capable of being applied to the distilling or rectifying of spirits, provided that a vent be given to the air arising with the spirit after the latter shall be condensed.

The Patentee recommends that however numerous the blowing pipes may be, their lower orifices should be distributed as evenly and equally over the whole surface of the bottom of the pan as possible; and that the stream of air should issue from every one of them at the same time.

This invention appears to us to be good in principle, as currents of air passing through and agitating liquids will greatly assist the evaporating of them; and also that the degree of evaporation is more under the command of the operator than heretofore, but how far the apparatus is applicable and practicable to the manufacture of sugar, or crystalizing liquids, remains to be proved. There are some further improvements in the manufacture of sugar about being specified, which, as the subject is of much importance, we intend shortly to lay before our readers; in the mean time we are open to communications on this subject from the Patentee or our friends.

To JAMES WHITE, *of Paradise Street, Lambeth, in the county of Surry, for his Invention of a Machine or Apparatus for Filtering, which he denominates an Artificial Spring.*—[Sealed 8th Nov. 1827.]

THE Patentee denominates this invention the "hydrostatic paradox," because he causes water to filter upwards.

The apparatus may be made in many forms, the principles of the invention being preserved, which are obtained by the downward pressure of an extended column of water of sufficient force, when acting upon a volume of water in a close vessel, to express the water through the top of the close vessel, which is made of filtering stone.

Plate XIV. fig.3, shews one mode of applying these principles to the filtration of water; *a*, represents a cistern or reservoir of water, placed at a considerable elevation; *b*, is a long descending pipe, leading from the bottom of the cistern into a close vessel *c*, filled with water, the top of which close vessel is formed by a filtering stone, tightly fitted into the vessel, and rendered perfectly secure and water tight at the joints. The downward pressure of the descending column of water will act with such force upon the water in the close vessel *c*, as to force it upwards through the filtering stone *d*, into the upper compartment *e*, where it will be found to have become perfectly filtered and clarified, and is ready to be drawn off by the cock for use

These being the principles of the invention, it is obvious that they may be adopted in various tasteful shapes, of which no further description need be given.—[*Inrolled in the Inrolment Office, May,* 1828.]

To PIERRE ERARD, *of Great Marlborough Street, in the county of Middlesex, Musical Instrument-maker, in consequence of communications made to him by a certain Foreigner residing abroad and discoveries by himself, for an Invention of certain Improvements in the construction of Piano-fortes.*—[Sealed the 20th of Feb. 1827.]

THE Patentee states in the commencement of his specification, that the very great approbation bestowed both by amateurs and professors, upon the improvements in Grand Piano-fortes, which formed the subjects of his Patents of 22nd December, 1821, and of 5th of January 1825, has encouraged him to devise a method of adapting the same contrivance to square and every other form of piano-fortes; and it is the accomplishment of this object which constitutes the leading features of the present improvement.

The first of these improvements is fully described in the Fourth volume of our First Series, at page 230, and in Plate XIII,—the second in vol. 12, p. 183.

The present specification is for the most part a repetition of the principles of construction, set forth in the former, though somewhat differently modified as to shape. The improved escapement, as it was formerly called, by which the keys of the instrument are made to actuate the hammers and bring down the dampers, is introduced in this as in the first mentioned specification, but with the addition of a lever to each key, which lever communicates the action of the key to the hammer, and the other parts of the mechanism, and effects a more instantaneous blow upon the string, and consequently renders the key more delicate to the touch than any other construction of mechanism before produced has been capable of affording.

As the specification is very long, and the figures of the parts represented by working drawings appear rather complicated, and we consider not likely to be generally interesting, we deem it unnecessary to devote a plate to this subject, as by reference to the former specification above mentioned, the invention will be tolerably well understood. One other feature in the present invention is to brace the frame work of the piano-forte with metallic bars instead of wooden rails, in order to give a greater degree of strength, and enables the frame to sustain the very powerful tensions of the strings.—[*Inrolled in the Inrolment Office, Aug.* 1827.]

To John Underhill, *of Parkfield Iron Works, near Wolverhampton, in the county of Stafford, Iron Master, for his Invention of certain Improvements in Machinery or Apparatus for passing Boats and other floating bodies from a higher to a lower or a lower to a higher level, with little or no loss of water; and which Improvements are also applicable to the rising or lowering of weights on land.*—[Sealed August 13, 1827.]

The Invention of conveying vessels or floating bodies from one level to another, which is proposed as the subject of this Patent, is carried into effect by the following means.

Supposing that a boat or barge were proceeding from a higher to a lower level of the canal, a cradle or frame with wheels is to be lowered down below the surface of the water, and the boat or barge floated immediately over it. The cradle is then drawn up out of the water by means of chains and powerful machinery, having the boat or barge resting in it; and the running wheels of the cradle being guided against inclined railways, are made to run up the railway by the power already mentioned, carrying the cradle, with the barge in a level position, on to a platform just above the surface of the water. From this platform the cradle and the barge are lowered again by the agency of the power and the suspension chains above mentioned, the wheels of the cradle running down other inclined railways to the water, at the lower level of the canal, where the boat or barge is again set afloat and the cradle drawn up to the platform ready for a similar operation.

Plate XIII. fig. 4, represents a section of part of a canal, *a,* being the surface of the water at the upper level, and *b,* the surface at the lower level; *c,* is a boat or barge about to proceed to the lower level; *d,* is the cradle formed of iron framing with running wheels; *e,* is the standard supporting the pulley or drum wheel, round which the suspension chain is coiled, which pulley or drum must be driven by a power adequate to raising the weight of the cradle with the boat or barge and its load in it.

The cradle having been lowered down below the surface of the water, as shewn by means of the suspension chains *f,* attached to the upper rails of the cradle, the the boat or barge is then brought over it, and the cradle raised so as to take the boat out of the water. The running wheels of the cradle pass up the inclined railways *g, g,* by the power exerted in raising the weight, which weight they of course partly sustain and guide the cradle, with its load, on to the platform *h.*

From the platform, the cradle, with the boat or barge, is lowered in a similar way; the wheels running upon the desending railways *i,* until the cradle is below the surface of the water, and the boat or barge is again afloat on the lower level of the canal at *b.* Precisely the same mode is employed in raising a boat or barge from the lower to the upper level of the water.

There is a contrivance for opening a portion of the top part of the rail, to allow the running wheels to pass on to the lower inclined rails, which is effected by means of an arm or tappet on the side of the rail, which is thrown open by the fore part of the cradle striking against it in passing over, and which is closed again by the hinder part of the cradle; but the small scale of the figure will not admit of showing it perfectly.

The Patentee proposes to employ the same contrivance for raising and lowering heavy weights, from one level to another, on land.—[*Inrolled in the Inrolment Office, February* 1828.)

To Julius Pumphrey, *of Tally Hill, in the county of Worcester, Glover, for his having invented or found out certain Improvements in Steam Engines and Machinery connected therewith, to propel Steam Boats and Vessels, some parts of which Improvements are applicable to other purposes.*—[Sealed 3d Feb. 1829.]

This invention is a sort of rotatory steam engine consisting of two cylinders, placed side by side; and communicating with each other; in each of which a piston of a peculiar form is made to revolve by the pressure of steam acting on one side of it; and these pistons being respectively affixed to a longitudinal shaft running through the axis of each cylinder, the mechanical force obtained by the pressure of the steam against the pistons, is by these revolving axles communicated as a driving power to work other machinery.

Plate XIV. fig. 1, represents a section of the engine taken through the two cylinders transversely, and shewing the relative positions of the two pistons, at a certain point of their rotations; *a,* is one piston, *b,* the other, *c, c,* are the two induction valves opening inwards for the passage of the steam into the cylinders; *d, d,* are the eduction valves opening outwards for the discharge of the steam after it has performed its duty. The arrows shew the way that the pistons revolve. Steam of considerable pressure is supposed to be flowing into the cylinder on the left hand through the induction valve *c,* the periphery of the piston, *a,* being by packing made to fit tightly against its cylinder and that of the piston *b,* against the axle of *a,* the escape of steam is prevented, and is consequently the elastic force exerted by the steam causes the piston *a,* and its axle to revolve in the direction of the arrows. It will be perceived that the edge of the piston *a,* was just passed the induction aperture, and of course that the steam has but just began to flow into the cylinder on the left hand. It will also be perceived that the piston *b,* has just cut off the steam by closing the induction valve of the right hand cylinder, and as it proceeds will almost immediately open the eduction valve *d,* and allow the volume of steam to escape, which occupies the right hand cylinder.

The elastic force of the steam in the left hand cylinder continuing to act, drives the piston *a,* round in the direction of the arrow, until that edge of the piston, which is at the lower part of the cylinder will come to the upper part, and cut off the steam by closing the induction valve *c*; at the the same time the piston *b,* revolving, its lower edge passes the induction valve *c,* and allows the steam to blow into the right hand cylinder; the steam from the left hand cylinder passing off at the eduction valve *d,* as before described.

Thus the two pistons *a,* and *b,* are alternately acted upon by the steam and made to revolve, and their axles being connected together at the outer part of the cylinder by a pair of toothed wheels, they move simultaneously, and communicate the combined powers of the two pistons from either of the shafts as convenience may dictate.

The packing for rendering the periphery of the piston steam-tight, is introduced at *e, e,* there being a recess in the side of each cylinder for its reception; and round the cylinders there are several rings, or ribs, *f, f, f, f,* for the purpose of giving strength, which contrivance of ribs or rings on the outside is also proposed as an improvement in the construction of boilers for generating steam, and is claimed under this Patent as a novelty and improvement.—[*Inrolled in the Petty Bag Office, March,* 1829.]

To James Walker, *of Weymouth Street, in the parish of St. Marylebone, in the county of Middlesex, Esq. for his Invention of an Improved Castor or Furniture.*— [Sealed 10th November, 1827.]

This improvement in the construction of castors for furniture, is designed to afford facility in turning and supporting to that side of the castor on which the weight of the piece of furniture carried is principally thrown, which will be between the pin or perpendicular stem and the roller. The mode of producing this support is by placing a collar or washer between the under side of the foot socket of the castor and the socket of the pin or stem, and also raising a shoulder or ledge on that side of the socket of the stem when the principal weight is to be sustained.

Plate XIV, fig. 2, represents a section of the castor; *a*, is the socket made nearly cylindrical in which the foot of the piece of furniture is to be fixed; *b*, is the perpendicular pin or stem inserted into the socket *c*, *c*. The collar or washer above mentioned shewn at *d*, *d*, is placed round the pin or shaft *b*, bearing against the under side of the foot socket *a*, and the upper side of the socket *c*, *c*, and turning freely upon the pin *b*. The socket *c*, *c*, is made to fit the pin or stem *b*, loosely, in order that it may turn freely, and has a piece of steel *e*, at bottom as a bed on which the end of the stem bears. On that side of the socket *c*, which is next to the roller, a shoulder or elevated part *f*, is made, extending about half way round, for the purpose of supporting the weight carried by the castor in the event of the stem *b*, bending by any extraordinary strain. The stem *b*, is secured in the socket *c*, by means of a groove formed round its lower part at *g*, into which a small pin *h*, is inserted by passing the pin through the side of the socket. The roller turns upon a steel axle supported in forked arms as usual, extending from the side of the socket *c*, of the stem above described.—[*Inrolled in the Inrolment Office, May*, 1828.]

To **Richard Williams,** *late of Tabernacle Walk, in the county of Middlesex, but now of Canterbury Buildings, in the county of Surry, Civil Engineer, for his having invented certain Improvements in the application of Elastic and Dense Fluids to the propelling of Machinery of various descriptions.*—[Sealed December 15, 1828.]

The subject of this Patent may be called a steam-engine, though it is designed to be worked by any kind of elastic vapour, whether steam or gas. It consists of several hollow vessels immersed in oil or other dense fluid, into which vessels a volume of elastic gas or steam is occasionally thrown. When, by the levity of the vapour occupying the vessel (the oil having been expelled) the vessel necessarily rises to the surface of the oil; and this ascent of the vessel through the dense fluid in which it is immersed, produces the power excited by the engine; and several of these hollow vessels being connected by means of rods to a crank shaft, the combined force thus obtained and concentrated in the shaft, is to be employed as the driver of other machinery.

A mode of applying these principles is shewn in Plate XIII. fig. 3, represents the section of a tank nearly filled with oil, having three hollow vessels immersed in it; and beneath the oil tank is a boiler containing water for generating steam; *a, b, c,* are the three hollow vessels, which may be made of any suitable material; *d, d, d,* are piston or guide rods, connected at one end to the upper surface of the hollow vessels, and at their other ends to the crank rods *e, e, e,* which are again connected to the cranks on the shaft *f, f; g, g,* is a boiler for generating steam; *h,* is the furnace, with its flues *i, i, i,* surrounding the sides of the tank containing the oil. Steam being generated in the boiler *g*, is admitted through the slide valves *j*, *j*, *j*, into the steam chambers *k*, *k*, *k*, where it is confined by the valves *l*, *l*, *l*, until wanted to fill the hollow vessels *a*, *b*, *c*, supposing the hollow vessel *a*, to be immersed in the oil as far as required over the steam chamber *k*, as shewn in the figure; a small stud on the inside of the vessel *a*, will have depressed the lever of the valve *l*, and opened it, thereby allowing the steam from the chamber *k*, to escape into the vessel *a*, forcing out the oil previously in it; the lever of the valve *l*, is also connected by a small vertical rod to the slide valve *j*; and, as the valve *l*, is opened by the descent of the hollow vessel, the valve *j*, is simultaneously closed, and prevents the further escape of the steam from the boiler. The specific gravity of the steam in the vessel being much lighter than that of the oil, and also its elastic force, will cause the vessel *a*, to rise, and by its connexion with the crank, force round the shaft *f*, *f*, until it rises to the top of the tank, and in the position of the third hollow vessel *c*, when the rod of the valve *m*, striking against the under side of the cover of the tank opens it, and allows the steam to escape into the top of the tank, and out of it by the pipe *n*. It is only necessary to observe, that as the vessels rise, another stud on the inside, striking against the ends of the levers of the valves *l*, *l*, *l*, closes them, and at the same time opens the slide valves *j*, *j*, *j*, for the purpose of admitting another supply of steam into the chambers *k*, *k*, *k*. What power the Patentee thinks of gaining from this method of using steam we do not know, has he thought which is the easiest way of the steam to escape from the hollow vessels out of the bottom, and to rise through the oil, or after forcing up the vessels, piston rods, connecting rods, and actuating the machinery, shafting, &c. to open the valve *m*, and go out by the pipe *n*.

To Joseph Clisild Daniel, *of Simpley, in the parish of Bradford, in the county of Wilts, Clothier, for his having invented certain improvements in the Machinery used for dressing Woollen Cloths.*—[Sealed September 18, 1828.]

This is an improvement to be adapted to a gig mill, for raising the pile of woollen cloths. The principally operating part of a gig mill is a large cylinder, on the periphery of which rows of teasles, and sometimes wire brushes are placed, for the purpose of causing the points of the teasles or brushes to take hold of the filaments of wool, and thereby draw out or raise the pile on the face of the cloth, as the gig cylinder revolves rapidly, having the cloth in contact with it.

In the gig mills usually constructed in Gloucestershire, the teasles or brushes are placed round the periphery of the cylinder in rows longitudinally, that is, parallel to the axle of the cylinder or gig barrel, as it is technically called; and these rows of teasles or brushes stand at certain distances apart, leaving spaces in the periphery of the barrel unoccupied, or perhaps open. By this construction the barrel assumes the form of a poligonal prism, instead of a cylinder; and the face of the cloth, as it passes the angles, being rubbed by the edges of the teasle frames, occasionally produces inconvenience by injuring the face of the cloth in the opinion of the Patentee.

To obviate this objection, therefore, in the construction of the West country gig barrels, it is proposed to introduce a longitudinal roller between each teasle frame or brush, the rollers being mounted on axles with pivots turning in eyes or bearings, which stand radially round the edges of the gig barrel.

Plate XIV, fig. 4, shews a portion of the periphery of a Gloucestershire gig barrel, viewed edgewise; *a, a,* is the rim on the edge of the barrel *b, b,* the cloth passing over the face of the barrel, its face being operated upon by the teasles, as the barrel revolves; *c, c,* are the rows of teasles set in frames of the ordinary kind, which extend across the barrel in the same direction as the axle at certain distances apart, and parallel to each other. Between each of the rows of teasles or brushes are the rollers *d, d, d,* supported by, and turning in the bearings *e, e, e.*

By thus introducing the rollers *d,* the cloth is supported at the angles, and prevented from being injured by rubbing against the edges of the teasle frames or brushes.—[*Inrolled in the Inrolment Office,* March, 1829.]

To JOSEPH CLISILD DANIEL, *of Simpley Stoke, in the parish of Bradford, in the county of Wilts, Clothier, for his invention of certain Improvements in Machinery, applicable to the dressing of Woollen Cloth.*—[Sealed May 26, 1829.]

THIS invention, like the preceding, consists of a certain improvement to be adapted to a gig mill for raising and dressing the pile of woollen cloths, and is to be employed in conjunction with the improvement described in the specification of the former Patent, to which reference is made.

In order to enable the teasles or the points of wire card or brushes to act with greater delicacy, than in the ordinary gig mills in raising the wool or pile of fine cloths, and to prevent the ground of the cloth from being injured by their action, it is proposed to render the bed or support of the teasle frames elastic, so that the teasles or points of the cards may give way when any extraordinary pressure of the cloth comes upon them while under the operation of giging.

The manner of effecting this object will be understood by reference to figure 4, Plate XIV, above referred to, in which *a, a,* is the rim of the gig barrel; *b, b,* the cloth under operation, its face being towards the barrel; *c, c,* are the teasles mounted in frames as usual; *f, f,* are blocks of wood fastened to the gig barrel, and to these blocks the teasle frames are attached by hinge joints *g, g,* which enable them to rise and fall; *h, h,* are bent wire hooks, for the purpose of securing the opposite sides of the teasle frames, and preventing them from rising. There are pins or studs *i, i,* fixed in the blocks *f;* the upper ends of which pins or studs pass into corresponding holes in the under parts of the teasle frames. Round these pins or studs there are small helical or wire springs placed, which, being compressed into tension by the teasle board when shut down, as in the figure, produce the elastic bearings of teasle boards, which enable them to give way to any extraordinary pressure of the cloth against the teasles.—[*Inrolled in the Inrolment Office,* November, 1829.]

To ELIAS CARTER, *of the city of Exeter, in the county of Devon, Upholsterer, for a new Covering for the Roofs of Houses and other Buildings.*—[Sealed October 11, 1827.]

THIS invention consists in particular shaped plates of iron, or other suitable metal, which are so formed that when put together on the framing of a roof, will form a weather-tight covering. Figs. 8, 9, and 10, Plate XIV, are perspective representations of these improved plates. Fig. 5, is a similar view of a number, when placed together on a roof. Figs. 6, and 7, are sections, shewing the manner of placing the plates, and the way the joints are formed. Fig. 8, *a*, is a representation of what is called the roof plate, it is formed with three of its sides turned up, and one turned down, as a lip at *b*. This plate is tapered narrower towards the lip end by twice the thickness of the plate. Figs. 9, and 10, are representations of the plates used to form the ridge of the roof. Fig. 9, *c*, is the low ridge plate, and has two of its sides *d*, *d*, turned up, and the other two *e*, *e*, turned down. Fig. 10, *f*, is the high ridge or cap plate, having all its sides turned down; it will be seen that the ridge plates are formed with an angle in the middle, so as to slope each way of the roof. Fig. 5, is a representation of the manner of putting these plates together to form the covering of a roof; *a*, *a*, *a*, are all roof plates, placed with the lip *b*, downwards, towards the eves of the roof; and those marked *a**, *a**, *a**, are also roof plates, but placed with the lips *b*, upwards; it will be observed that these roof plates are placed in alternate rows; the plates *a*, *a*, *a*, are first laid with the lips *b*, lapping over the plate next below it, as shewn in the figure. The plates *a**, *a**, *a**, are next laid in rows on each side of the row of plates *a*, *a*, *a*, and lapping over their sides; and then the low ridge plate *c*, is placed on the ridge, and last of all, the high ridge plate *f*, is laid, which completes the portion of the roof; the high ridge or cap plate having to lap over four of the edges of the other plates, it should be made larger than the rest. Fig. 6, is a cross section through a portion of a roof covered with these plates; and fig. 7, is a section taken the reverse way, or along the roof, shewing how the sides and lips of the plates lap over each other. The Patentee does not confine himself to any particular metal, but recommends that they be made of cast iron, 3-16ths of an inch thick, and about two feet square, and the sides and lips two inches deep.

To Charles Turner Sturtevant, *of Hackney, in the county of Middlesex, Soap-boiler, for certain Improvements in the process of manufacturing Soap.* [Sealed 26th of May, 1829.]

The Patentee states that his invention consists in a process whereby he can make pure alkaline lees unite with animal or vegetable matter in the soap copper, by which he is enabled to use caustic alkalies instead of the crude alkalies, such as barilla, kelp, and the like, now in use for that purpose; thereby avoiding the residuum which is used in the process of black ash making, and which causes much waste of animal matter: this is proposed to be done by putting into the copper, in the first instance, a small portion of soap and water, and mix them well together, so as to form a saponaceous compound, to which is added a small quantity of tallow or fat, or oil, as the case may be, mixing it with compound, and adding thereto as much caustic soda lees as will be taken up, by these materials without separating. In this manner animal or vegetable matter as aforesaid is continued to be added, and also caustic soda lees till the copper is full, gradually increasing the fresh doses of animal or vegetable matter, and alkali in proportion as the quantity of matter in the copper accumulates, keeping the mixture well roused or stirred during the whole of the process; when this is accomplished, it is moulded in frames in the ordinary way. The best strength for the caustic soda lees, is about one thousand two hundred and sixty specific gravity, and the temperatures used in the boiling may be the same as heretofore adopted; but the Patentee recommends the use of smaller coppers, and of an oblong shape, capable of containing from two to four tons, and prefers their being heated by steam.

The Patentee claims as his invention the following improvements:—first, using pure caustic alkaline lees in the soap copper, instead of the lees now in use, thereby doing away with the residum aforesaid:—secondly, commencing the operation of boiling with the saponaceous compound aforesaid, and adding animal or vegetable matter and caustic alkali thereto in the manner described till the copper is filled.

To CHARLES SANDERSON, *of Park Gate Iron Works, near Rotherham, in the county of York, Iron Master, for a new method of making Shear Steel.*—[Sealed 4th Sep. 1828.]

THIS invention consists in forming shear steel out of very small pieces of bar steel, instead of pieces from one to two feet in length, as is generally practised, whereby it may be formed with fewer heats, and consequently with less waste and without the use of silicious sand, as usual.

The Patentee proposes to take bar steel in the state in which it comes from the converting furnace, and break it into very small pieces of from one to two inches long, which are to be piled as closely and compactly as possible upon a round stone, of any quality which is capable of withstanding the strong heat of a reverberatory furnace without cracking or breaking; the whole is then to be inclosed in a fire clay crucible and placed in a reverberatory furnace, where it is allowed to remain until the whole mass becomes of a high welding heat; it is then taken from the crucible and placed under a heavy cast-iron hammer, usually called a metal helve, similar to those used in the manufacture of bar iron; these hammers are generally driven by machinery, and from the circumstance of the whole mass being in a semi-fluid state, it is almost instantaneously hammered or manufactured into one solid mass or bloom of steel, of from three to four inches square; this bloom is placed in a furnace, or a hollow fire, of two or three feet square heated with coke, and the heat increased by the application of a blast of air, and the whole mass or body of the steel so hammered or manufactured is raised to a high welding heat; and is then taken from the furnace and placed under the helve or hammer before mentioned, and drawn into a bar of shear steel, ready to be tilted or rolled into the various sizes or shapes which may be required. For shear steel to be used for inferior purposes it would be too expensive to place the piled steel in a crucible, but it might merely be placed in a reverberatory furnace, and drawn from thence when a welding heat. Shear steel made in this manner is said to be superior in quality to, and much cheaper than that made in the ordinary way, and the process as described causing much less waste than that generally adopted.

To JAMES GRIFFIN, *of Witty Moor Works, near Dudley, in the county of Warwick, Scythe Manufacturer, for an improvement in the manufacturing of Scythe Backs, Chaff-Knife Backs, and Hay-Knife Backs.*—[Sealed April 26, 1828.]

THIS invention consists in forming scythe backs, and hay-knife backs with raised studs or pegs, for the purpose of rivetting the cast steel blades thereto, and which studs or pegs form part of, and are solid with the said backs.

The usual manner of forming the backs of cast steel scythe blades, is by forming a piece of iron into the shape required, and then by welding or by drilling holes at proper distances; for the purpose of receiving the studs or pegs by which the blades are rivetted to the backs.

The object of the present improvement is to construct the backs with raised studs or pegs, which are of a piece with the backs; consequently when so formed, will be found much stronger than those which are perforated for the purpose of rivetting on the blades. Fig. 14, Plate XIV. represents a back of a scythe formed according to this plan; fig. 15, is a view of the same as seen edgeways; *a*, *a*, *a*, are the raised studs or pegs by which the blade is to be riveted to the back; the blade is shewn attached to the back in these figs. The Patentee recommends, as the best mode of making backs according to his invention, to be by passing the iron or other metal at a proper heat through a pair of rollers having a groove around the circumference of one of the rollers of the size and shape required, and small holes sunk in the groove at proper distances, so that when the heated iron or other metal has passed between this grooved roller and a plain roller, it will come out with raised or projecting studs or pegs on one of its surfaces, which studs or pegs are formed by the metal being passed into the sunk holes. The end of the back at *b*, is then to be formed by welding and forging it to its proper shape, and the back is to be cleaned by rough filing, and will then be ready for having the blade riveted thereto, which is done by beating down the studs or pegs *a*, and making them spread over the holes formed in the blade. It is obvious, that the back of chaff and hay-knives may be formed in the same way, and the Patentee does not confine himself to the mode described of making them, but claims as his invention the forming of the studs on the backs, and being part of the same metal.

To JOHN MORFIT, *of Cookridge, near Leeds, in the county of York, Bleacher, for an improvement on Retorts used by bleachers, and makers of oxymuriatic acid, or of oxymuriate of lime.*—[Sealed 15th December, 1828.]

THE kind of retort described under the patent is made of lead, of a cylindrical form, four and half feet in diameter, one and three quarter inch thick at bottom, one inch thick at the sides, which are one and a half foot deep; this cylindrical part is covered at top by an obtruncated cone of the same thickness as the sides, inclined so as at its top to rise two feet above the bottom of the retort; the upper flat part of this top is about two feet in diameter, and is inclosed round its edges by two concentrical vertical rims, about three inches high and one and half inch apart, and the cylindrical rim of a circular cover descends into the space between them, which when used has its junctures with the retort luted with a mixture of clay and water.

The improvement on the retort consists in lining the internal surface of its sides with glazed tiles, formed with that degree of curvature necessary for their contact with them, and having one of their upright edges grooved and the other formed with an angular projection, so as mutually to clasp and adhere to each other, when set up in their places. These tiles the Patentee directs to be made of the clay used for fire bricks and glazed in the usual manner employed by potters; the crevices of their joints when arranged in the retort, and that between them and the sides of the latter, are to be filled with powder made from the tiles by pounding or grinding. The use of this improvement is to prevent the corrosion of the internal surfaces of the sides of the retorts, which is observed to take place when they are used for the purposes mentioned; and which are intended by means of the glazed tiles, to be defended from the action of the oxymuriatic-acid.

The retorts are suspended in brick-work by rims that project from the upper edges of their cylindrical bodies; and into the hollow spaces left beneath them, and round about their sides, steam, or strongly heated air, is then admitted, to cause by its high temperature the oxymuriatic-acid to pass over from the materials placed within them, into receptacles of the usual construction.

To George William Lee, *of Bagnio Court, Newgate Street, in the City of London, Merchant, for certain improvements in machinery for Spinning Cotton and other fibrous substances. Communicated by a Foreigner.*—[Sealed 2nd May, 1829.]

The invention specified under this patent is intended as a substitute for the ordinary flyer used in spinning machinery. A cast iron frame pierced with holes for a spindle and bobbin to work in, is formed with a circular rim or hoop rising above the surface of the frame, having a groove formed in its circumference, in which a ring is allowed to work with facility. A small hook, for conducting the yarn to the bobbin, projects from the latter, and is placed in the relative situation of the lower extremity of the arm or arms of ordinary flyers. Two modifications of this apparatus are mentioned in the specification, one consisting of a groove formed in the upper edge of the rim, in which the segment of a ring works, having also a hook attached to it, the segment in this instance is sufficiently large to cause a proper degree of friction, so as to regulate the tension of the yarn. The other mode, the rim itself, is made to revolve on friction pulleys, having an indentation formed in its edge to serve instead of the hook in the former mentioned instances, the friction pulleys, working in grooves cut in its circumference. In the above methods the spindles must be made to rise and fall as in ordinary machines, to procure the equal distribution of the thread, and that the bobbins may be made half as long again and even more, with advantage, provided the vibration be regulated accordingly. The Patentee states, that by the above-described apparatus he is enabled to obtain a greater velocity than by the flyer and the ordinary movements of the bobbin, and that he is thereby enabled to spin a greater quantity of yarn without shifting, whilst this has also, from the friction of the ring, a more even degree of tension, and that the trembling motion, arising from the wear of the spindle, is not of so much importance when fitted according to his method.

To ANDREW GOTTLIEB, *of Jubilee Place, Mile End Road, in the county of Middlesex, Locksmith, for certain Improvements and additions to Locks and Keys.*— [Sealed June 1, 1829.]

THE invention described under this Patent is for detecting any attempt to pick or unlock locks with a false key, by means of a piece of paper fixed on four pointed projections formed in a plate of metal which is placed at the back of the lock, and immediately over the plate covering the works. A false key introduced would perforate the paper, and lead to immediate detection of any attempt to open it. The real key is made to unlock without destroying the paper, by having a projection about half way up the shank of the key, which moving a washer, causes a spring to act on the plate on which the paper is fixed, and forces it up without fracture. For still further security the Patentee directs part of a leaf of a cheeque book to be employed, from which designs can be cut, bearing a corresponding one in the margin, in order to prevent the substitution or removal of the paper placed in the lock.

To JOHN SMITH, *of Bradford, in the county of York, Corn Miller, for certain Improvements in Machinery for dressing Flour.*—[Sealed June 4, 1829.]

THE improvements under this Patent, consist, first, in using iron ribs for forming the frame of the dressing cylinder; secondly, in a method of fixing the wire-work thereto; and lastly, in using an external brush to cleanse it. The iron ribs are formed of two semicircular pieces of iron joined together by screws and nuts, and kept firm by two bars at opposite sides passing through transverse perforations made in each rib; through the latter, in a contrary direction, are also formed numerous other perforations for the admission of screws which pass through the wire-work and the holes prepared for them, and are then screwed firmly in their place by finger nuts, whilst the heads of the screws fit into a groove or channel formed along the inner circumference. The brush is to be placed above the cylinder, and both are caused to revolve, though with different degrees of swiftness, by means of gear properly arranged for this purpose: the axis of the brush turns in a two armed lever, which latter is caused to move easily on a pivot at certain intervals, being acted upon by a second lever attached to part of the gear, in order to raise it when the connecting bars, in passing, would otherwise come in contact with it, and prevent its working. An internal brush is also used, as in the usual machines.

REPORT

Of the Select Committee of the House of Commons on the Laws of Patents.

(Continued from page 309.)

Benjamin Rotch, Esq. called in; and Examined.

Have the goodness to give the Committee any information you can upon the subject of the present inconveniences of the patent laws, and any remedies you think might be applied to them? —I am of opinion, from the experience that I have had in that particular branch, and to which I should say I have directed particular attention, that I certainly think the difficulty and uncertainty attending patents and their specifications, is a cause why the government do not receive at least three or fourfold the amount they would, of revenue from that particular department: but I am not at all of opinion that the uncertainty of patents, and of their being maintained, depends particularly upon the faulty mode in which the description of the invention is often set forth in the specification; I know there is a very strong opinion abroad, by the public at large, that it would be desirable, if a commission was appointed, to examine into every specification, and that that commission having decided that a specification is good, the patentee should be absolved from all responsibility on that head. To that I think there are a great many serious objections, and particularly for this reason,—as a perfect description of the specification, is the only thing the public get in return for the monopoly for fourteen years, which is certainly a very great boon for any individual, you take away certainly from the interest that the patentee has in giving that fair description which will enable the public, when the patentee is dead, we will say, or the patent expired, to benefit by the invention to the full extent that the patentee himself did; you take away his incentive to do that, if you take away his responsibility that it shall be correct, and throw that responsibility on the commissioners; for certainly my experience tells me that, in three cases out of four, it is the main object of the patentee to deceive the public if he can, and nothing but the dread and fear of losing his patent altogether keeps him constantly from imposing on the public by a false description. In some cases, even that fear will not operate ; a case that I may mention is familiar to almost every body, and will illustrate what I have said as well as any thing I can say: in the case of those elegant visiting cards which have been lately shown about with an enamel on them, that is produced solely by a particular white colour which is brought from Germany; the inventor, a German, came to me on the subject of his specification, and told me it was done with the purest chemical white ; I said, " it appears to me it must be the German white (Kremnitz white) ; he said, " it is the purest chemical white ;" shielding himself under the knowledge that the Kremnitz white was purer than any other; he would not allow me to put in his specification the Kremnitz white, but made me put it " the purest chemical white." I said, " you take the responsibility on yourself, and recollect if your patent is ever upset on this point you absolve me upon it," and I even made him write a note to that effect; and years afterwards, during the whole of which period the English manufacturers had been trying to make it and had failed, somebody says, " it is Kremnitz white ;" I believe it was Ackermann, who is a German, and they repealed the patent. I supported it all I could, and contended because Kremnitz white is the purest chemical white, it was accurately described, not *eo nomine,* but by a faithful description, in saying it is the purest chemical white; but the Lord Chancellor properly said at once, "this is not a description on which the public can act ; at any rate the patentee knew a better one :" that will only show the Committee the feeling there is, if possible, to conceal something from the public. You might succeed with commissions nine times in ten. Commissioners almost uniformly get careless in their office by time ; they have not the same motive to put so much zeal into their examination of specifications as the patentee has himself, if he knows it must be upset at any time, however long, if any defaultis detected in it ; therefore when one considers monopolies (when that name is given to them) always have a degree of odium in the public eye, and when you consider that the specification is the only return a patentee makes for the monopoly, it does seem extremely desirable that every possible incentive to induce that man to do right should be held out to him. It is also a fact, that as the specifications are now drawn, certainly in the course of my practice, (and I have thought about the subject since my attention has been brought to it by the summons I received from the House,) I never recollect but one case in which a patent was upset for want of a proper description merely of the invention in the specification, that is, with regard to the mechanical means of carrying it into effect; that is to say, a description by which a person could not do the thing if he was set to work to do it. Many patents are upset on the specification, but then it is on points arising out of the law as it now stands, which is in itself uncertain, from circumstances that I will endeavour to explain, and which certainly, to my mind, wants most material alteration. In the first place, the statute of James, which is called the statute of monopolies, passed at the time when those injurious monopolies were granted, which are now restrained by the statute restraining all monopolies except those for patent inventions for fourteen years; and the words of the statute, which are extremely well calculated for those times, do not happen now at all to hit the necessities of the present period. The consequence is, that the judges are constantly straining the meaning of this act to make it meet the necessity of the times. Thus it exactly depends on the extent of laxity that a judge will venture to give as to what the law at this particular day in any particular court happens to be on patents. The word in the statute is "manufactures"—that monopolies shall be granted for fourteen years for the sole working or making of any manner of new manufacture within this realm; then comes the question, what are "manufactures;" now if it is discovered that in bleaching cotton, instead of dipping it, we will say, first in an acid, and then in a water to get rid of the acid; if it is found better to mix the acid and water together, it may be an improvement of thirty per cent value to the manufacturer, and that advantage in the process is no doubt most important in the present time, when every thing depends on the excellence, the rapidity, or the cheapness with which you do a thing. In fact, three patents out of four are taken out for new processes, by which well known ends are obtained; that cannot be considered as a new maunfacture; a new process by which you obtain an old manufacture is not a new one; it is a mere mode of putting together known elements to effect a known end. But some judges, my Lord Tenterden for one, are so open to the necessity of granting patents for these things, because they are so vastly important, that they will say, "that is the meaning of the word, 'manufacture'" Another who is a statute lawyer, would say, "nonsense; *manufacture* means no such thing, this is only a process." A man takes out his patent with this conflicting evidence as to the judges, for "a new manufacture of bleached linen." Then that will be upset in the specification, because one judge will say, "it is not a new manufacture, it is a new process." If he takes out his patent "for a new process of bleaching linen," he will again upset it, because he says, "you cannot have a patent for a process;" he will quote the authority of Lord Mansfield, who says,—the way in which you can determine what is a patentable article and what is not, is simply by asking yourself this question; Is it a vendible article or not? who shall say, mixing acid with water, instead of using them separately, is a vendible article. The judge, who is adverse to Lord Mansfield's decision, says, you cannot have a patent for a process. Then Lord Tenterden, in a celebrated judgment which I have here—The King and Wheeler, attempts to determine what a new manufacture is; the words of his Lordship show how completely he is puzzled to make it mean what patents ought to be granted for at the present day, to meet the times. He says, "the word manufacture has been generally understood to denote; he only says, "has been *generally understood to denote* either a thing made, which is useful for its own sake, or vendible as such; as a medicine, a stove, a telescope, and many others; or to mean an engine or instrument, or some part of an engine or instrument to be either employed in making some previously known article, or in some other useful purpose, as a stocking frame, or a steam engine for raising water from mines; *or it may, perhaps, extend also;*" that is what I complain of, as the cruel judgment which makes the law uncertain; "or it may, *perhaps*, extend also to a new process to be carried on by known implements or elements acting upon known substances, and ultimately producing some other known substance; but producing it on a cheaper or more expeditious manner, or of a better or more useful kind; but no merely philosophical or abstract principle can answer to the word "manufacture." That little word *perhaps*, sets us all at sea, and nobody can say positively what title to a patent the courts will support or will not.

What remedy do you propose for that?—This difficulty embraces undoubtedly almost all the points on which patents are upset on the specification. I will come in a moment to the remedy. The second point is that on which patents are upset, most frequently; for on these two points almost all patents are upset. It is the novelty of the invention, which has nothing to do with the specification at all; and it is a false idea to suppose it is the want of a just description, by which a mechanic can follow the process or make the engine that is the subject of the invention, which causes the patents to be upset on the specification. Now the remedy that I would suggest for the indecision in the Judges, is to make an extension of the statute of monopolies. Another distortion, however, the Judges have made of this statute, because it was not wide enough to meet the necessity of the case; the statute says, there shall be no patent granted "except to the true and *first* inventor thereof," and yet we find the Judges sanctioning the grant of patents for importation of inventions from abroad; and the Judges say (to my ear excessively absurd) that means an inventor; a man who imports from abroad is an inventor; and in order to make it come within the statute, without which they could not grant it, they distort the meaning of 'original inventor,' by saying a man who has a friend, who writes a letter from abroad, "such a thing is in existence," takes out a patent for it as for an importation, expressly so stated in his affidavt, and that person is held by the Judges to be the inventor. That is merely to show how the Judges are obliged, from the change in the times, to strain the meaning of this unfortunate Act. The remedy therefore I would suggest, to put all this straight, is to adopt the common sense decisions of the Judges, and to form a statute which shall embrace those objects which, although without the pale of this Act, are every day the object of patent grants, and sanctioned and supported as such in courts of law by the Judges. Now I would therefore suggest, the new statute should not limit the granting of patents to fourteen years merely to any manner of new manufacture within this realm, but it should embrace the following heads, which I have taken the liberty of writing down, and which, as it appears to me, are all heads which are now sanctioned by law, although not by this statute, and confirmed by the decision of some of the Judges. The first would be "A new manufacture or an article of sale;" and it is difficult to find a proper term to use; some people say an engine is not a manufacture; I adopt my Lord Mansfield's opinion then, that it means a vendible article: 2dly, "A new process of making either a new or a known manufacture, or article of sale;" and, 3dly, "A new application of a known manufacture, engine or article of sale, such not being patented at the time." This will need a little explanation; it has been held by the Judges, that when an individual has an invention which is patented, no improvement on that ought to be allowed as the subject of a patent, because the merit is in the original invention; as, for instance, the great steam engine; there were no improvements allowed on steam engines until after the patent had run out, except such as Watt and Bolton invented; after that had expired each man could have a patent for any particular improvement of his own. Therefore I have said a new application as one subject for granting patents; a new application of a known manufacture or article of sale, such not being patented at the time. Then the fourth head I should suggest should be, an improvement on any known manufacture or article of sale not being patented at the time, or being patented, not without the consent of the original patentee. Perhaps I might illustrate the first, of "A new application of a known manufacture," by referring to a pair of bellows; suppose a man has obtained a patent for a pair of bellows, and he only knew it as an engine for blowing the fire—increasing the heat of a furnace; it has been laughably enough said by my Lord Eldon, "would you then," (he was averse to granting patents for new applications to known inventions) he said, would you then grant another man a patent, because instead of blowing a fire with those bellows, he blows the dust off his pictures with it; that is a new application;" my answer is, no; but by a new application of a known invention, I mean such an application as requires some modification to adjust it to your purpose. For instance, a bellows being only known as an engine to blow a fire, I would say that the inventor who first applies it to the purposes of an organ, and arranges it and modifies it in such a way as to suit the purposes of that particular instrument, is entitled to a patent for his application of a bellows to that purpose; and therefore a new application of a known manufacture, or article of sale, I should limit to such an application as requires modification, and an invention of something for the purpose of so applying it. Then under the fifth head, I would class "Inventions imported from abroad not before used in this kingdom." I contend that they are not at all provided for in the statute of monopolies, and that it is not only a strained meaning of the words to decide otherwise, but an absolute perversion of the statute. I think it highly important that inventions imported from abroad should be patented, because I have had much experience to show how many we never should have had if it had not been for that statute which protected them for fourteen years. That is the end of the list.

You have stated you would not allow a person to take out a patent for an improvement pending a patent for that article already obtained by another person, is that the distinction you draw?—It is; let me explain, that there is one modification attached to that also, which I omitted to mention, as there is to "A new application;" the new application, unless there is some invention connected with it to make it applicable to this new purpose; so I would also put a qualification to the fourth head, which is the improvement, and which is in fact now held by the judges, namely, that you shall not have a patent for an improvement on a patented article, unless that improvement is something that may be sold totally separated from the article already patented, so that you shall not involve any part of the original invention to cary off, as it were, your improvement.

By that means supposing you had a patent, and a great improvement was discovered by an individual; if he had your consent, if that was made into a law, would he be barred from going forwards, with the consent of the original inventor.—There could be no difficulty in that, and for this reason; he could still come to me and make an agreement with me, without that being part of the law; he could come and say, "You may have a great improvement in your patent; your patent protects me already in that improvement, if you will agree with me; if I tell you the improvement and you adopt it, we may share in the profit;" but the original patent will always protect that improvement, and there is no necessity for a patent for the improvement. I think it desirable that the public, or that an individual should be restrained from, even with the consent of the party, taking out a patent for an improvement; because from my experience in these matters, I know it would lead to endless quarrels and disputes, as to the consent being given or not being given; and moreover, because I have always felt, although that is of course for the Committee and not for me, that it is useless to legislate on a point which protects itself; and that as the original patent protects the improvement, so the individual who takes out his patent or who has an invention, goes to the patentee to get his consent to make use of it, which would be the advantage, as if he did it under a patent; with this exception, that he can only enter into that agreement for the remainder of the term of his patent; but look at the danger of allowing patents for improvements, even with the consent of the party, on articles that are already patented; it would continue a patent *ad infinitum*, improvement on improvement, just as their fourteen years are expired; because it is what patentees come to me constantly to know, if they cannot for some little improvement obtain a patent on their own patent, which would be an extension of the term to twenty-eight years instead of fourteen, and thereby shut the public out of the benefit they are to have at the end of the fourteen years.

How would it carry the patent on for double the time; supposing the patent was a slight one, the public might use the patent article without the improvement; would it not only be to secure the improvement?—The only way I should explain that would be this; if the improvement is a thing *sui generis*, of itself distinct, any particular safety valve to a steam engine; if the use of that is of particular importance to the steam engine, the valve as a valve may be patented. I will suppose a steam engine to be now known for the first time, and to be a patent article; if you take out a patent for an improved steam engine, and introduce that valve as the improvement, you carry on the patent for the engine and for the valve, by uniting the valve with it, you carry on the patent for the engine for another fourteen years; but if the valve is so distinct from the engine that you take out your patent, not for the improved steam engine but for the improved valve, or a valve applicable to a steam engine, you may have that at this day; because whether you apply it to the steam engine, or not, is a matter between you and the patentee of the steam engine; that comes within my qualification of this head, which is an improvement which is of itself distinct, and may be used without the original invention, and is such a thing as you may now have a patent for.

But supposing a person taking out a patent for an improvement, and he includes in that patent the original article in such a way as to preclude the public from making use of it, would not that be a forfeiture of the patent?—Yes, according to the present law, if he include it as a part of his patent, because a patent that is bad in part is bad in the whole; a man cannot take out a patent for an improvement on his own patented invention, any more than he can on any other person's; and if he should include the original invention in a new patent with the improvement, provided the original invention be patented, he forfeits his patent; but if he waits until the end of the term for which the original article is patented, he then can take out his patent for the improved steam engine.

Have you any objection to the law remaining in that state with respect to improvements?—I cannot quite comprehend.

Do you see any objection to that state of the law?—Not the least in the world, but I want it should be provided for by statute, and it should not be in the breast of one Judge to say that is not law, and of another to say it is law; it is only the present state of the law according to the decisions of the Judges, but not according to the statute of monopolies. One Judge will fly back on the statute and say, improvements are not provided for in the statute—"I hold this is bad;" another will stretch a little further and say, "this ought to be the subject of a patent, and I will hold it to be so." I myself wish it to be made the statute law. These heads have appeared to me to be such as would embrace all the decisions on what are now held to be the subjects of patents, whereas only one of these is embraced, strictly speaking, in the present statute of monopolies; but there is another point on which all the Judges are at variance, not only with each other, but with themselves, sometimes deciding one way, and sometimes deciding another; and the only person who seems to have been uniform in his decision on the subject is the present Lord Chancellor, and that is, whether or not *a new principle*, reduced to practice, may be the subject of a patent. This is the most important head, and therefore it is extremely important that the law on that subject should be defined. I consider that there is no need to introduce a head classing that as one subject of a patent, because it is not sufficiently defined, or a new principle reduced to practice; but I consider it would be of prodigious importance to the public, if my Lord Lyndhurst's decision were made law; namely, that although you can have no patent for a merely philosophical or abstract principle, that you may have a patent for a new principle, provided that new principle be reduced to practice; and I will take the liberty of giving an illustration, as perhaps the most familiar mode of bringing it home; that is this, a person in Scotland lately has discovered, where the great object is to save time in distilling their spirits, for time and heat is every thing to them, he has discovered that by throwing his wash into his boilers in the form of a shower, as we will say, out of the holes of a watering-pot, which brings it into a shape that exposes a vast surface of the wash to the heat, which otherwise could not be if it laid in the mass as one undisturbed quantity; he distills four times as quickly perhaps, and saves therefore a large proportion of coal and much time. It never has been done before; I assume, for the purpose of the argument, that it is not. Now there are fifty ways of effecting this; you may force a jet against a triangular piece of metal with such force as to distribute the whole into a complete mist in the still; you may do it by driving it through horse hair cloths, which will let it come through in drops, every drop has its whole circumference exposed to the action of the heat; the grand invention was the first thought of exposing wash in that minutely subdivided state to the action of the heat. He has described and perfected one way of doing it; but it is suggested to him directly there are five hundred other ways; must I describe all these ways in my specification? I say no; the patent that is for a principle, is in fact the only patent that is worth having; because, for example, a hat is known; where you take out a patent for an improvement in the dye of the hat, another in the stiffening of it, it is only as far as each process goes he can have a patent; if another man finds out a better way to do the same thing, he can have a patent also: but if hats had never been dyed black before, and that was found to be useful and possessed of many advantages, the man should have his patent generally for black hats: so with regard to this, the invention is subdividing the wash as it is exposed to the heat, the causing it to be exposed to the heat in that state; if another man could come and take out his patent for causing that mist to arise in the pan in another way, where is the use of this first man's patent? although the second man might not have ingenuity to think of the thing, yet, being once told of the new principle, he could invent a better mode of carrying it into effect. That the law has been acted on by some judges, which I would wish to establish by statute, is quite clear from the case of Bolton and Watt; the moment the term of their patent grant expired, which was extended to twenty-one years, there were numberless improvements immediately, and are to the present day; none of the same value to the patentees as the original invention; because they were competitors.

You began by stating that this shower would be a principle, a new principle?—Yes, supposing it to be done for the first time.

But if that be so, if it had been done in a steam engine before to raise steam, then would you call that a principle as regards distilling; both is raising a vapour?—That is getting a legal opinion from me as a lawyer, on a subject that does not touch this question; because you will understand I am here only contending it would be extremely desirable to extend the law to any new principle reduced to practice; I do not pretend to say what are new principles, that must ever be determined by a jury: I have put the shower as an illustration of a principle reduced to practice; the question you have asked raises a special case as to the novelty of a particular question.

Is it not the law now?—Only in the breast of the Lord Chancellor. Lord Tenterden says, no merely philosophical or abstract principle can answer to the word "manufacture;" that is taken hold of as laying down broadly you could not have a patent for a principle. I will tell the Committee where it was acted on the other day, and a decision directly against the patent; and where it was reversed again on an appeal, and held to be right; which shows no man can say what the law is on the subject; in the case of shearing cloth, it was discovered that a much finer nap was produced by shearing the cloth from list to list, that is from one side to the other, than by shearing it lengthways—a machine had been prepared for shearing it lengthways, which was a roller with knives on it, running round very rapidly against a rail which had one blade on it, and passed along the cloth lengthways and thus sheared it; that was the first time that a cutting roller had ever been used. A man took out his patent after this had expired, for the application of the roller for shearing cloth from list to list, which had never been done before, and showed how he did it by a machine which adopted this roller, which was previously known, to this purpose by a new arrangement; therefore there was a principle of cutting from list to list, which was the important point reduced to practice by this new mode of arranging this roller; he took out his patent for shearing cloth from list to list; the lawyers were all up in arms, and said this is a patent for a principle, a mere idea, shearing cloth from list to list. On the other hand, it was contended, the man has reduced his idea to practice, and he shows you how it may be done, and any man reading the specification can do it: shearing from list to list by means of this roller is the grand object, and then he takes out his patent for doing it by a rotary cutter, which had never been done before. Some of the Judges would have upset the patent; Lord Tenterden maintained it, and said distinctly, that the principle being reduced to practice, and the principle of shearing from list to list with a rotary cutter being new, the patent was good. How can a lawyer after that be certain how to advise his client? He cannot say, "My advice is, if you try that before one Judge such will be the result, or before another Judge such will be the result." I want it to be made law by statute, so as to prevent the Judges varying in opinion on that point; and it appears to be common sense, that a new principle reduced to practice should be the subject of a patent, provided it be new; if it be not new, that is the subject for a jury to decide; whether or not having been used in a steam-engine, for instance, does away with the novelty of the principle, should be for a jury to decide.

Can you define a principle?—Any new principle reduced to practice.

It might be as to distilling a new principle, as to raising vapour for another purpose it might not; if you talk of principle, the query is, whether you will not find there cannot be a principle discovered?—If there be no such thing as a new principle in what the patentee claims, then the patentee cannot have his patent for it; that is quite clear, and his patent would be upset.

Looking at it practically, would not the same thing be gained by saying there should be no patent for a principle?—You say, there should be no patent for a principle, unless reduced to practice; is not the reducing any thing to practice which is new, patentable, without talking of principle at all?—It is necessary I should give an example before I can satisfy that question.

How do you define a principle?—Johnson's Dictionary definition of it. Whether a thing is new or not must be the subject, and I hope ever will be the subject for a jury to determine. Do the Committee wish me to state what I conceive may be a new principle?

How is cutting from list to list a new principle. Is it not a new practice?—It is new to do it with a rotary cutter. I make use of the word principle, as it is commonly understood by the world. I will suppose raising the upper masts of ships by means of a lever has never been done before; if a man takes out a patent for raising a mast by means of a lever, no modification of that should be allowed to cut him out of his patent; the principle is raising a mast by means of a lever. If a man takes out a patent for exposing liquid in the form of mist or vapour to the action of heat, he may apply it; and he says, I show you how I do it; he applies it to a still. If it could be shown that is done before in a steam-engine, the principle is not new; the principle is the same in both these inventions, and he should have taken out his patent under the third head I have suggested, namely, for the application of the known principle to a still. He should have confined it, and this would be a subject of controversy among counsel at the trial, but which I hope no commission ever will be appointed to decide on, but will ever be left to a jury to determine. One man says, "it is only a new application;" a man is at liberty to take out his patent for a new principle, or a new application; if he elects to take it out for a new principle, and it is old, his patent will be upset as a matter of course; but if he takes it for a new application of a known principle, the use of the steam-engine will not upset his patent. That does not affect the general question as to what I propose to make law; the case proposed to me is merely a particular one, in which the patentee may have done wrong, and if so, will forfeit his patent in consequence.

What the Committee would ask is this, as to that which you have defined to be a new principle,—whether you would consider a man taking out a patent for that principle, would give him the exclusive use of it, both as for distilling and as for the steam-engine; taking it in that sense,—whether you consider it a new principle in each, or only a general one that would ride over each?—That again, as I said before, is a legal question; it must depend entirely on the way a man takes out his patent: and supposing the principle to be new, and a man takes out his patent for the principle of exposing water in the form of a shower to the application of heat, as a good mode of raising vapour; if he takes it out for that, then I say he shuts the public out from using that principle for any thing. Is the law different at the present day? I am not aware I am introducing any new law, I am only settling what is law. Look at the steam-engine, that was a patent distinctly for a principle, and whatever that steam-engine was applicable to, and whatever modification it required to make it applicable to different purposes, no man was allowed to take out a patent for a steam-engine, or to apply the power of steam to mechanical purposes during the period of Bolton and Watts's patent.

What do you call the principle of that patent of the steam-engine? Now describe, in words, what it is?—Unless I have the patent before me I cannot describe it.

What is the principle?—I do not sufficiently recollect the patent, but I can describe the lever-fid principle, if that will explain my meaning to the Committee.

You said, the patent was distinctly taken out for a principle?—Yes.

Interpret to the Committee what you meant by the word 'principle;' in that case, what was it that entitled that patent to be called one of principle?—I will take another patent that I am more familiar with, for my illustration. A person takes out a patent for a lever-fid that supports the topmast of a vessel; a man takes out a patent for doing that by means of a lever; I should say, the principle is the doing it by means of a lever, however arranged or contrived.

Would that embrace a screw; a screw is a lever.—Certainly not; it has been held over and over again, that we are to take terms as they are understood mechanically and technically, and not philosophically. I never knew any difficulty to arise until to-day, as to defining what a principle is; but there is a difference of opinion as to whether a principle reduced to practice should be the subject of a patent. Let me name another instance, a gas apparatus: for the first time gas was allowed to enter into a wheel and turn it round; it was the first time that ever a revolving gasometer was made use of. The one that was originally made, was found not to answer at all, it was thrown by, and another man taking the idea of a revolving meter, invents one that does act; it goes on for ten years; everybody adopts the latter, nobody the other. Lord Tenterden held, although they were not at all alike in practice, yet in principle it was the same thing; it was the gas forcing its way through the wheel that turned it round, although they had entirely altered the shape, and made it perform in a totally different manner, yet Lord Tenterden held the principle in both was the same, and the principle was pirated.

What would the law be upon that; the first man would not be able to adopt the second man's plan?—Most decidedly he would.

Was that held as law?—That was held as law; it was proved the first man immediately laid by his own invention, and has never made any but of the second man's plan.

He was held justified, because he was the first inventor of that principle?—Yes, of a rotary meter.

Mr. John Taylor, called in; and examined.

Are you conversant with the taking out of Letters Patent for Inventions?—I have had some experience formerly, but not much of late; my time was then chiefly employed in manufactories, which led me interfere with patents.

What is your opinion as to the policy of the laws relating to the granting Letters Patent, as a mode of rewarding inventors?—As to the policy of rewarding inventors, it seems to me just and right that some reward should attach to inventors; and there can hardly be such a reward without some monopoly, at least as far as my judgment goes.

Describe to the Committee the mode of taking out a Patent? As soon as an invention is to be exercised in this way, it becomes necessary, in order to secure it, to keep it perfectly secret for some time; the law, I believe being, that any publication before sealing a patent would vitiate that patent; this seems to me to be the practice, and is one of the general objections to the present law; because as the invention, be it what it may, necessarily involves experiments of some sort, and as those experiments can hardly be conducted perfectly in private, or without the assistance of workmen or others, a revealing of the secret may thus take place which is fatal to the patent afterwards, if confidence is broken.

Have you taken out patents yourself?—Yes; I took out a patent for oil gas, and have been concerned in others.

What is the first step taken by a person who desires to obtain a patent?—The first application, I think, is for a caveat, which entitles the party taking out the patent to notice from the Patent Office, in case any one applies for a similar invention.

Of something supposed to be similar?—Yes.

Is that a mode usually resorted to?—Yes, that is the common mode resorted to, I believe; the intention seeming to be, to give support to inventions against incroachments which might be made upon them, which might not be fair.

Upon a person's receiving notice that a patent is applied for for a similar invention, what takes place?—A hearing is appointed before the Attorney General, and each party states explicitly to him the nature of his invention; and the Attorney General then decides whether the patent is to be stopped by the previous invention or not.

Do the contesting parties make their statements in the presence of one another?—Certainly not; the statement on both sides is to the Attorney General only; no other party being present.

State, as far as your experience goes, whether it frequently or very seldom happens that an opposition has any effect?—Very seldom, that I have known; I was opposed upon some patent I took out; and I had to make a statement to the Attorney General, who decided it instantly.

I think the Attorney General considers that every applicant who takes out a patent, is to be at the risk of any opposition which is made to it?—Yes; it is at his own risk entirely.

What is the expense of entering a caveat and of resisting a patent?—The entering a caveat is a very small expense; I think a guinea or two; and it may be continued for a small annual sum—do you mean the expense of obtaining a whole patent?

No; the whole expense arising from opposing a person applying for a patent?—I do not know exactly, I do not recollect that part of the business; there are other gentlemen who can tell you more about the charges than I can; but it depends a good deal upon the expense which the parties are put to in making the models or preparing plans; I believe it is not very expensive; but it sometimes happens, in order to make the subject intelligible to the Attorney General, that a good deal of expense must be gone into.

Is it not sometimes necessary, that very expensive models should be prepared?—Yes: in some cases it is.

That of course is attended with very great expense?—Yes; but taking out the caveat is not attended with much cost.

Are persons obliged, when they take out a patent, to enter a caveat?—They pay for a caveat in order to entitle them to notice of any new patent which they think might interfere with their patent, and for which they are therefore obliged to become opposing parties; and further, in order to know every patent that passes through the office, by paying a certain annual fee of a guinea or two, which I believe is the charge of the caveat, they become entitled to constant notice of patents which are applied for; of course they are informed of such as are likely to interfere with their patents.

Are you aware that caveats are sometimes entered, stating the invention claimed, in very general and indefinite terms, with the sole object of enabling the parties who have entered them, to oppose parties applying for patents, and thereby compelling them to make a compromise with them?—I have heard that this is done, and that persons have taken caveats out upon some concealed principle; and when any patent is applied for, which they have thought might be opposed by such caveats, they have called upon the parties, and a treaty is entered into, and it sometimes follows, that a sum of money has been agreed upon to be given that the opposition should be withdrawn.

Do you think that practice exists now?—I have never experienced it myself, but I have heard of it.

When a patent is granted, I believe it is upon condition that the thing applied for shall be described?—Certainly it is.

Do you conceive that practically there is much difficulty in making a specification?—Yes, great difficulty while so little opportunity is afforded to the inventor for experiments to devise the best means of carrying his invention into effect; he is obliged to make his experiments without the assistance of others, and without such assistance it is impossible for him to have the power of making all those trials which would give him the best opportunity of describing faithfully to the public his invention, and any error he may make in his specification, however unintentional, would afterwards completely vitiate his patent; it appears to me one of the greatest difficulties of the present law.

What is the time usually granted?—The usual time is two months I believe; but sometimes it is extended by the Attorney General on particular reason being shown, such as that it is more than commonly difficult to describe the invention in the time usually allowed; I know one instance where there was a patent in which one of my brothers was concerned, it was a printing machine originally invented by an ingenious foreigner, it required an immense deal of thought and labour, and involved much mathematical calculation; I believe twelvemonths was allowed for that specification.

But in the present state of the law, would it not be inconvenient to give a longer time for the specification?—It would, certainly, as other parties might be injnred by it.

Might it not, in point of fact, enable a party to avail himself for some time of the benefit of the patent, and after all not give the public the benefit of it?—It might also defeat other inventors in their plans.

Does any remedy occur to you to prevent inconveniencies of that sort; are you aware of any other course which could be pursued?—I confess I have not considered the subject well enough to be able to give an opinion upon it.

Do you know what the law of France is in that respect?—In some points I do know the law of France, but I am not very conversant with it; I apprehended they adopt a totally different principle in France. I believe there patents are referred to a commission, composed in some degree of scientific men,

Is a commission appointed in each case?—I believe so; in England the principle is, that the risk of the patent is upon the patentee, who must defend it at great expense. The principle in France, is, I think, to settle first whether the patent is to be granted by referring it to scientific men, and if they determine that it is a fair subject for a patent, the law then protects it, and there is no risk to the patentee afterwards.

Do you think that a scheme of that sort could be adopted in this country?—I doubt whether a commission of that kind would be according to the common principle of the English law; but I do uot pretend to have thought much upon the subject.

Do you not think a commission, composed partly of lawyers and partly of scientific men, might be appointed, for the purpose of examining a specification, in order to ascertain whether the machinery might be made according to the description given?—I

I think it would be liable to many objections; at the same time there might be some advantages in it, but I doubt whether the objections would not over-rule them.

What are the objections which occur to you?—Perhaps the difficulty in the first place, would be in selecting scientific men, and there might be a good deal of jealousy as to their decisions; I think the great objection would be, the difficulty of appointing such a commission as would satisfy the public and the inventors.

But if that difficulty was obviated, would any advantage arise from the appointment of a commission for such a purpose?—Then I conceive such a plan might be very advantageous, as it would determine the thing at once.

So that the patent might not be impeached upon the ground that the specification had not accurately described the thing?—Certainly on that ground, and probably also on others, such as whether the invention was new or not, which might be decided in the same manner.

Do you conceive it possible there would be any difficulty in finding persons to form a commission fully competent to decide on these points?—I think men might be found to form a commission of that sort: but perhaps a court of justice would, after all, be more satisfactory to the parties.

Are you aware that persons frequently specify incorrectly, for the purpose of misleading the public, and concealing from them their invention?—No case of that kind has come within my own knowledge, but I have heard is it so; but a specification very often is found to be incorrect, more from the cause I have before stated, than from intention to mis-state it.

Are you acquainted with Arkwright's case?—No, I am not particularly.

You say you have heard that. Supposing it to be true that persons sometimes specify incorrectly with a view of concealing their invention from the public, would not a commission, such as I have described, confer as much benefit on the public by guarding it against incorrect specifications, as on the patentee?—I think it would. I remember where a most important improvement on the manufacture of oil of vitriol was the object of a patent by Mr. Hills, which was litigated for a long time; it was a case in which I happened to be a witness; and the specification was attacked upon the ground of its being inadequate; the patentee however succeeded in defending it; it was evident he might have made a better specification if he had had proper time to have carried his invention as far as he afterwards did; and a doubt arose, whether by making the invention afterwards more perfect, he had in that way departed from the specification to a certain extent, and thus had vitiated the patent. The court certainly held he had not done so, and refused to set the patent aside; but it was much contested, and the patentee very nearly lost a great deal of money and labour which he had bestowed upon the process.

It is one of the rules of law, that the title of the patent must very accurately correspond with the description given in the specification?—It must certainly include every thing.

Is not the first idea of an invention often very imperfect?—Certainly.

Does it not often happen that the inventor makes great alterations and improvements in his invention, between the time of his making application for his patent, and that of enrolling his specification?—Yes.

Supposing, between the time of his taking out his patent and the period for enrolling his specification, he should discover very considerable improvements in his invention, what course is he obliged to take?—The title must include the whole invention; as the law now stands, every inventor tries to frame a title that will include every thing relative to his invention, and may, in fact, make it rather a delusive title; for instance, a person taking out a patent for oil gas, may call it a patent for a better mode of lighting, or something else taking in the whole; or an improvement in steam engines may have been put under the title of certain improvements in machinery; and so, by using very general words, taking the most ample form, so that the invention may be clearly comprehended without pointing out particulars.

Would there be any danger, in such case, of the patent being void for uncertainty?—Not if the title includes the invention truly: it is common for titles to be of that description. I have stated an exaggerated case to explain the thing, but that is the principle upon which every one goes; and there is another reason for what I have stated, the patentee wishes to avoid discovering to other inventors for what he is about taking out a patent, and gives it a title which may mislead.

But it may often happen they cannot precisely describe their invention?—Yes, certainly.

And that causes great difficulty, if his title will not include his invention?—Of course, then, his patent would be good for nothing.

Would he be obliged to take out a fresh patent?—Yes, he would be obliged to take out a fresh one.

Have they any means of avoiding that in France?—I am not sufficiently acquainted with the detail of the French law of Patents, to give that information, but I believe it goes before the commissioners; I do not know whether their law of title is the same as ours exactly.

If a man, in his specification, includes a thing as new which has been previously discovered, the patent for the whole invention is void?—Yes, the whole patent.

Do not you think it would be a benefit to the public, if a plan was adopted by which a man should be allowed to retain a patent for that part which is new, making it void only for what is old?—Certainly; it has appeared always to me a great hardship and injustice, that a man should he deprived of the whole patent.

According to the present law, an inventor who *bona fide* intends to give ever so true a description of his patent. may yet give so imperfect a description, that he may lose his patent?—Certainly he may, most unintentionally.

Would not a commission, authorized to consider and determine upon the sufficiency of a specification, be a means of guarding against this evil?—If it were possible so to alter the law, that that publicity which experiments may require, should not vitiate the patent, it might be beneficial; for instance, after giving notice, or taking out of a caveat, that then the inventor should have a certain time allowed for making experiments, and that such experiments being known to people to whom he will be obliged to reveal his secret (workmen for instance) should not afterwards vitiate the patent: and I should think that this would be a step to improvement, at any rate.

Between applying for the patent and sealing the patent, if there is any publication, that will vitiate the patent?—Yes. The law considers the publisher as the inventor, therefore, if I invent a thing, and I set about experiments, and call in any one to my assistance (and it is obvious, without the aid of workmen but little could in general be done,) any one knowing my patent, and becoming the publisher, that man publishing it in England in any way, would vitiate my patent afterwards, because, by the law, the publisher is deemed to be the inventor.

If a man enters a caveat, and his invention afterwards becomes published through the means you have stated, will he not be allowed to go to the Attorney General and say he is the first inventor?—That will not assist him in deciding his right to the patent if there is any publication afterwards. I apprehend from the time of his taking the first step to get a patent to the time of sealing the patent, which is the last step, any publication would vitiate the patent if proved subsequently at any period in the whole fourteen years.

Does not that lead frequently to breaches of confidence?—It is apt to do certainly, but inventors generally apply to patent agents who are aware of that, and they caution them to trust their secret to no persons but those in whom they have entire confidence.

Are there not many inventions which require the assistance of a number of persons to carry the experiments into effect; an invention of machinery for instance?—Undoubtedly.

In that case then, a man is very unwilling to trust any body till the patent is sealed?—Certainly, and generally speaking they do not.

Does it then often happen that a person is obliged to make out a title for a patent before he knows exactly how to describe the invention?—I can relate what I did in my own case, where a mode having occurred to me of making gas from oil, &c. I proceeded to try a slight experiment assisted by my workmen, and to prevent their knowing what I was about, after I had made the experiment I instantly destroyed the apparatus. I mentioned it afterwards to my brother, and then waited patiently till the patent was sealed; of course I could have made a much better specification if I had been allowed to have gone more fully into experiments before the time which is allowed had expired.

You have said any publication of the invention before the patent is sealed, vitiates it?—So I have heard; and if there be a breach of confidence, and the person to whom the invention is entrusted first becomes the publisher, he defeats the inventor's patent; he cannot take out a patent himself because the other is the original inventor, and he has in a mode published it by the caveat; both lose it, the latter cannot step into the inventor's place.

Are there any means by which an inventor can guard himself against such a breach of confidence; for instance, by making those to whom he entrusts his secret enter into a bond not to divulge it?—I believe that is frequently done. I know a case very lately where a person intended to take out a patent; I do not know whether he has done so or not; I believe he is too poor to do it; he revealed the secret to two or three persons under a bond under a large penalty; he shewed it to me without any such proposition. I did not want to see it, but he did it in perfect confidence.

Workmen employed to perfect an invention are usually persons without property; how then would a bond from such persons be of any value or use to the inventor?—In such a case they would be of no use, and perhaps they would not be induced to give it.

Those persons however may equally commit a breach of confidence?—Clearly so; indeed it was lately in evidence in the last case which was tried of Mr. Crossley's, where it was in evidence that another person gave evidence against the patent who was a workman, and had access to drawings and plans which he used for the purpose of his experiments, and thus tried to vitiate the patent.

Since it is a principle of law that the publisher is considered as the inventor, how does it happen, that if a person concerned in the experiments upon any new invention divulges that invention, he is not entitled to a patent?—The other published before him to a certain extent; the first inventor would then show that he could bring proof he invented it, and had used it to a certain extent; and thus he could not claim the patent.

What is the sort of publication of an invention, which would vitiate a patent?—I believe a communication to any third person would prove it has been held sufficient publication; or if it has appeared in print in any way in any book circulated in England.

Do you conceive a communication of the invention to workmen, who are employed by any person to make experiments after a caveat and specification had been given, would be a publication?—I believe the courts have differed as to that point at different periods; I think a few years ago it was held that any thing in the shape of publication vitiated the patent; but I believe the construction of late years has been a little more favourable to inventors; of course I can hardly know what the real rule is; but I believe the practice of the courts formerly has rather differed from what it is at present; I own I have not had much experience on that subject; but I have understood the courts lately have discountenanced applications against patents on the ground of publication by confidential people, rather than to have decided in favour of such applications, and as far as they could have set their faces against it; but I rather think it is the practice of the different Judges than the state of the law.

Would the use of an invention not communicated to the public, preclude another person who may also discover the same invention from obtaining a patent for it?—No; such person certainly would not be prevented, if it was not published, but kept perfectly secret.

Could he, by applying for a patent, prevent other persons from going on with that invention?—I do not know; I have not much experience of such patents; but I should think, if he felt it necessary, he could enforce his patent against others, but not against a former inventor.

You think the patent in that case would stand good?—Yes, I think it would, because the second inventor is the publisher; and therefore the inventor, according to law, the other never having communicated it to the public; but I think the first inventor, upon proof that he had used it, could not be prevented going on to the same extent as he had formerly done; that is what I understand to be the law.

What do you mean by the words "to the same extent?"—That having carried on a secret process in his manufactory, and never having revealed the discovery of the same thing as the patent, I think the patentee could not stop the manufacturer, if he could prove he had worked it before the patent was granted.

Could the original person who invented it, stop the patent of the second?—No; he had never given it to the public, and that is what the public require by a patent.

Could he not stop the patent of the second person?—If he chose to publish it before the second person's patent was sealed, he could prevent its going forward to the world as that person's invention.

Do you not think such a case as that exists, as a person discovering an improvement in machinery, and keeping it private?—I think it would be difficult to keep secret any invention in machinery, as so many persons must necessarily be employed; a chemical invention might be kept secret, but I do not think a mechanical one could.

Do not such cases constantly occur, which leads to negociation between conflicting inventors?—Constantly; I think a patent may involve parts of principles which are found, when it comes to be used, capable of considerable improvement by the adoption of things claimed by others; the common practice then is to negociate. The Attoney General sometimes, I believe, recommends it.

There is a compromise?—Yes, by giving the first party an interest in the patent.

What is your opinion with respect to the policy of leaving specifications open to the public; do you conceive it desirable in any case, to give a commission power to conceal the specification if necessary, so that the invention might be more complete?—I think it would be of great advantage to the inventor, but I doubt whether it would not be giving to a party applying to take out a patent, too much protection against any improvement which might be made by others; it is a thing I can hardly judge of; of course it should only be concealed for a time.

Only for a time, not for the whole period?—That would involve a question of the duration of the patent altogether.

Have you any suggestion to make upon the period for which patents are granted?—Merely that there is a difficulty in the trem of fourteen years; it does not seem equally fair for all patents; one patent might deserve protection for three or four years, another for twenty years, and so ou, according to the utility and expense of them.

Then to whom would you leave the responsibility of giving a proper duration to patents ?—That would be one of the great difficulties of the commission. It is the practice I believe in France, to give patents for different periods.

Is not that left to the discretion of the person who takes out the patent, in some degree?—I believe it is; but I do not know exactly what the practice is.

Is there not a time fixed in France, beyond which patents cannot be prolonged?—Yes, they may.

Inventors there may take out patents for shorter periods if they please?—Yes, they may.

[To be continued.]

Polytechnic and Scientific Intelligence.

Leather Sheathing for Ships.

MAJOR HOWARD, boarding officer of all foreign vessels at New York, has forwarded to the editor, through Mr. G. S. Silliman, one of the inspectors of that port, some barnacles and muscles, taken from the bottom of the ship Atlas. This ship, owned by Mr. Chase, was fitted out about twenty-two months since, on a whaling voyage, and sheathed with leather. In some instances, the barnacle adhered directly to the bottom of the ship; in others, the muscle took the first place, and the barnacle mounted upon the muscle. In both instances, the neck or prominent and animal, and consequently exposed part of the barnacle seems to have been assailed either by external friction, or by fish, and its shell left; viz. its interior, as a cell for the residence of some foreign inhabitant. From some of these cells Major Howard extracted fish, of the largest class of minims, specimens of which will be forwarded to you. As this ship returned in an uncommonly foul condition, the impression is, that this mode of sheathing will disappoint the favourable anticipation of its projectors; as is evinced at least, in the estimation of Mr. Chase, in his now dismissing the leather, and substituting the customary materials of copper.

On the twinkling of the Stars, and the Deception in the number visible to the naked Eye on a clear Evening; by Benjamin Hallowell.—It is a familiar fact, that if a person take a stick with one end ignited, and cause the ignited end to revolve swiftly, there will appear to be a continued circle of light. If the circle be increased in size, or if the ignited end be made to revolve more slowly, the circle may be made to appear much brighter on one side than on the other, or it may appear bright on one side and entirely broken on the other. The twinkling of the stars and the deception in the number of stars visible to the naked eye on a clear evening, is somewhat similar to this. A fixed star having no visible diameter, only one stream of the rays of light that proceed from it can enter the eye; and since the fixed stars are at such an immense distance, the particles of light from one of them that would fall upon so small a surface as the pupil of the eye, must be at a considerable distance from each other. When therefore a particle of light from a fixed star falls upon the eye, it produces a vivid impression: this impression becomes gradually diameter, until another particle arrives, producing a vivid impression again. This causes the *twinkling*. Here the circle is unbroken—another particle arrives, before the impression made by the former one has entirely vanished. But the particles of light which proceed from more distant stars, fall upon the eye at too great intervals to keep up a continued image. Hence when a particle of light from one of these stars falls upon the eye, it produces a perception of a star; but when we endeavour to contemplate this star, it is *visible*, because the image formed has vanished, and another particle has not yet arrived to renew it. In this way we are led to suppose there are more stars visible, than upon examination we find.

The only cause why telescopes enable us to see stars that are visible to the naked eye, is, that they concentrate the rays from so large a surface, as to keep up a *continued image* of the star.

Differential Barometer. By the late W. Wollaston.

THIS instrument is capable of measuring, with considerable accuracy, extremely small differences of barometric pressure. It was originally contrived with the view of determining the force of ascent of heated air in chimneys of different kinds; but as its construction admits of any assignable degree of sensibility being given to it, it is susceptible of application to many other purposes of more extensive utility. A glass tube, of which the internal diameter is at least a quarter of an inch, being bent in the middle into the form of an inverted syphon, with the legs parallel to each other, is cemented at each of its open extremities into the bottom of a separate cistern, about two inches in diameter. One of these cisterns is closed on all sides, excepting where a small horizontal pipe opens from it latterly at its upper part; while the other cistern remains open. The lower portion of the glass tube is filled with water or other fluid, to the height of two or three inches;

while the remaining parts of the tube, together with the cistern, to the depth of about half an inch, are filled with oil; care being taken to bring the surfaces of water in both legs to the same level, by equalizing the pressure of the incumbent columns of oil. If the horizontal pipe be applied to the key-hole of a door, or any similar perforation in a partition between portions of the atmosphere in which the pressures are unequal, the fluid in the corresponding half of the instrument will be depressed, while it is raised in the opposite one, until the excess of weight in the column that is elevated will just balance the external force resulting from the inequality of atmospheric pressure upon the surface of oil in both cisterns. This, however, is equal only to the difference between the weight of the column of water pressing on one side, and that of an equal column of oil which occupies the same length of tube on the other side; this difference depending upon the relative specific gravities of the two fluids, will, in the case of olive oil and water, be about one-eleventh of the weight of the column of water elevated. But the sensibility of the instrument might be increased at pleasure, by mixing with the water a greater or less quantity of alcohol, by which the excess of its specific gravity over that of the oil may be reduced to one-twentieth, one-thirtieth, or any other assignable proportion. The instrument may be converted into an areometer, by closing both the cisterns, and by applying to the upper part of each a trumpet-mouthed aperture, opening latterly.

AT a meeting of the society for the encouragement of useful arts in Scotland, Professor Wallace exhibited and described his eidograph, an instrument for copying, enlarging, or reducing plans, pictures, &c. for which he obtained the society's gold medal on a former occasion; and took occasion to point out the superiority, in the accuracy of its work, and the ease of its movements to the pentograph, the instrument hitherto generally used. The professor, exhibited in great variety, specimens of the work done by his eidograph, with which several scientific gentlemen present expressed themselves highly pleased.

Oxygen in Lithia.—A Russian chemist in Moscow has lately found in lithia upwards of 12 per cent. more oxygen than was given by the highest results of Vauquelin, Gmelin, or Arfwedson. By a repetition of his experiments, Berzelius has obtained nearly 55 per cent. for the oxygen in this earth. Berzelius supposes this high result to be owing to the greatpurity of the lithia transmitted to him from Moscow. The experiments, when published, will be of great interest.

Iodine and Bromine in Salt Springs and Mineral Waters in England.—Dr. Daubney, of Oxford, has discovered *Iodine,* in more than one of the Cheshire salt springs, and in several waters containing purgative salts, such as those of Cheltenham, Leamington, Gloucester, and Tewkesbury.

Mr. Murray seems to have preceded Dr. Daubeny in these discoveries. He long ago discovered iodine in the mineral waters of Cheltenham and Gloucestershire. He also discovered iodine and bromine in the brine springs at Ingestrie six months ago. See his *Manual of Experi-*

ments illustrative of Chemical Science.—See *Ann. of Phil.* September and October, 1829.

At a meeting of the Cambridge Philosophical Society, Professor Whewell read a paper on the causes and characters of the early styles of church architecture; and after the meeting gave an account, illustrated by a number of models, of the different modes of vaulting which succeeded each other in the early churches of Germany. The effect was pointed out which results in the construction of churches from this succession of contrivances, combined with other circumstances which arise from the division of the building into three aisles; and it was shown that the adoption of the pointed arch was one of the consequences which followed from the necessary progress of the art of vaulting; and explained the influence of the pointed arch upon the other members of buildings, through which influence the Romanesque style was at last superseded by the very opposite forms of the Gothic. It was stated also that the transition from one of these styles to the other, which took place in England by means of the *Early English* style, was made in Germany by means of a very different one, which may be termed *Early German*. Of this style the characters were given in some detail, and it was remarked that, among these, the invention of the flying buttress was of as much importance to the complete developement of the Gothic stile, as that of the pointed arch.

New Patents Sealed in 1830.

To George Vaugham, of No. 10, Cleveland Street, Mile-End Road, in the parish of Mile-End Old-Town, in the county of Middlesex, engineer, for his invention of a machine or pump for raising water or other fluids. 23d Jan.—2 months.

To George Stocker and Alexander Stocker, both of the parish of Yeovil, in the county of Somerset, gunsmiths, for their invention of a cock for drawing liquor from casks, which produces a stop superior to that which is effected by common cocks, and will continue in use for a longer period of time. 26th Jan.—2 months.

To John Arnold, of Sheffield, in the county of York, powder-flask maker, for his invention of an improved spring latch or make-fast for doors. 26th Jan.—2 months.

To George Frederick Johnson, of Canterbury, in the county of Kent, Tunbridge-ware manufacturer, for his invention of a machine or apparatus which is intended as a substitute for drags for carriage wheels and other purposes. 26th Jan.—6 months.

To Thomas Bulkeley, of Richmond, in the county of Surrey, doctor of physic, for his invention of a method of making or manufacturing candles. 26th Jan.—6 months.

To John Yates, of Hyde, in the county of Chester, calico printer, for his invention of a method or process of giving a metallic surface to cotton, silk, linen and other fabrics. 26th Jan.—6 months.

To James Cobbing, of Bury-Saint-Edmunds, cordwainer, for his invention of certain improvements on skaits. 26th Jan.—6 months.

To Samuel Wright, of Shelton, in the Staffordshire Potteries, for his invention of a manufacture of ornamental tiles, bricks and quarries, for floors, pavements, and other purposes. 26th Jan.—6 months.

To Robert Busk, of Leeds, in the county of York, gentleman, in consequence of a communication made to him by a certain foreigner residing abroad, for certain improvements in apparatus used for distilling and rectifying. 26th Jan.—6 months.

To John Revere, of New York, in the United States of America, now residing in the parish of Saint James, Westminster, M. D. for his invention of a new alloy or compound metal, applicable to the sheathing of ships, and various other useful purposes. 28th Jan.—6 months.

To Josias Lambert, of Liverpool Street, in the city of London, Esq. for his invention of an improvement in the process of making iron applicable to the smelting of the ore, and at various subsequent stages of the process up to the completion of the rods or bars; and a new process for the improving of the quality of inferior iron. 4th Feb.—2 months.

To George Pocock, of Bristol, gentleman, for his invention of improvements in making or constructing globes for astronomical, geographical, and other purposes. 4th Feb.—2 months.

To John Gray, of Beaumorris, in the county of Anglesea, gentleman, for his invention of a new and improved method of preparing and putting on copper sheathing for shipping. 4th Feb.—2 months.

To Charles Taverner Miller, of Piccadilly, in the county of Middlesex, wax chandler, for his invention of certain improvements in making or manufacturing of candles. Feb.—6 months.

To Joseph Clisild Daniell, of Limphey Stoke, in the parish of Bradford, in the county of Wilts, clothier, for his invention of certain improvements in the machinery applicable to the manufacturing of woollen cloths. 6th Feb.—6 months.

To Melvil Wilson, of Warnford Court, Throgmorton-street, in the city of London, merchant, in consequence of a communication made to him by a certain foreigner residing abroad, for an improved method of preparing, cleansing, paddy, or rough rice. 6th Feb.—6 months.

To Thomas Robinson Williams, of Nelson Square, Blackfriars Road, in the county of Surrey, Esq. for his invention of improvements in power looms, applicable to the weaving of wire and other materials. 6th Feb.—6 months.

To Edward Cowper, of Streatham Place, in the county of Surrey, gentleman, in consequence of a communication made to him by a certain foreigner residing abroad, for "certain improvements in the manufacture of gas."—12th Feb.—6 months.

To John Frederick Smith, of Dunstan Hall, Chesterfield, in the county of Derby, Esq. for his invention of certain improvements in preparing or finishing piece goods made from wool, silk, or other fibrous materials. 12th Feb.—6 months.

To Joseph Marie Ursule La Regandelle du Buisson, of Fenchurch-street, in the city of London, merchant, in consequence of a communication made to him by a certain foreigner residing abroad, for a new method of extracting for the purpose of dying the colour from dye woods and other substances used by dyers. 12th Feb.—2 months.

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GUTHRIE, PRINTER, 16, SHOE LANE.

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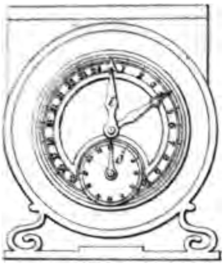
I. Walker's Operameter; Bonner's Safety Lamp; and Pool's improved Paddle Wheel.
II. Napier's Printing machinery.
III. Nicholls's Power Lever; Parallel Motion of a Steam Engine; and Applegarth's Printing Apparatus.
IV. Lihou's improved Rudder; and Parallel Motion of a Steam Engine.
V. Marshall's improved method of mounting guns; Ledsom and Jone's Nail making machinery, Berollas's Watch; and Apsey's Substitute for a Crank.
VI. and VII. Wayte's Printing Machinery.
VIII. Lever's improved Lace machinery; and Braithwaite and Erricsson's Steam Generator.
IX. Udney's improved Steam Engine; Chubb's Door Latch; Marbot's machine for cutting Mouldings.
X. Lever's Lace machinery, and instrument to show Refraction.
XI. Brown's improved Watch.
XII. Hillman's made Masts; Crompton and Taylor's Paper cutting machinery; and Stead's improved Paddle Wheel.
XIII. Scholefield's improved Loom; Williams' Vapour Engine; and Underhill's mode of passing Boats from different levels.
XIV. Pumphrey's rotatory Steam Engine; Walker's Castors; White's Filtering Apparatus; Daniel's improved Gig Mills; Carter's Roofs; Kneller's Evaporating Apparatus; and Griffin's improved Scythes.

Walker's Operameter.

Fig. 1.



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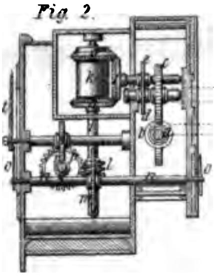

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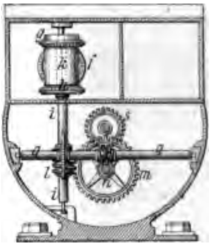

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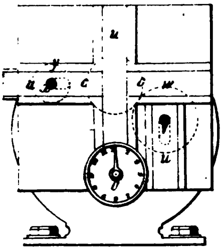

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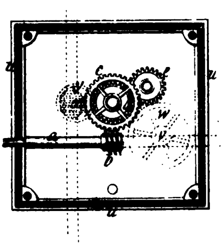

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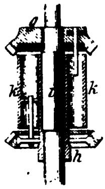
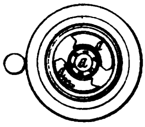


Bonner's Safety Lamp.

Fig. 8.



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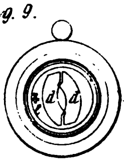

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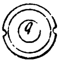

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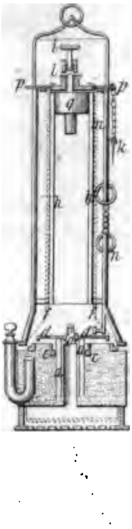
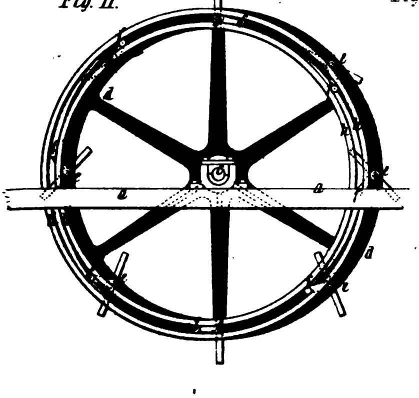


Pool's Impd. Paddle Wheel.

Fig. 11.



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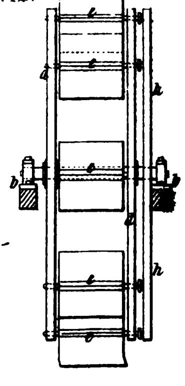
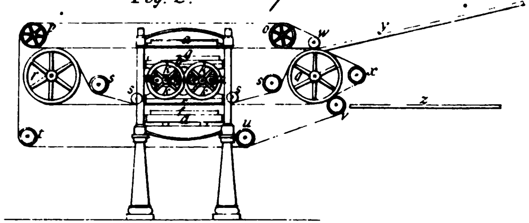


W. Newton Del. October 1. 1829. C. Gladwin

Napier's Printing Machinery.

Fig. 2.



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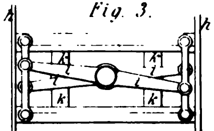

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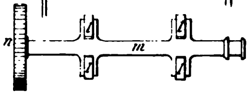

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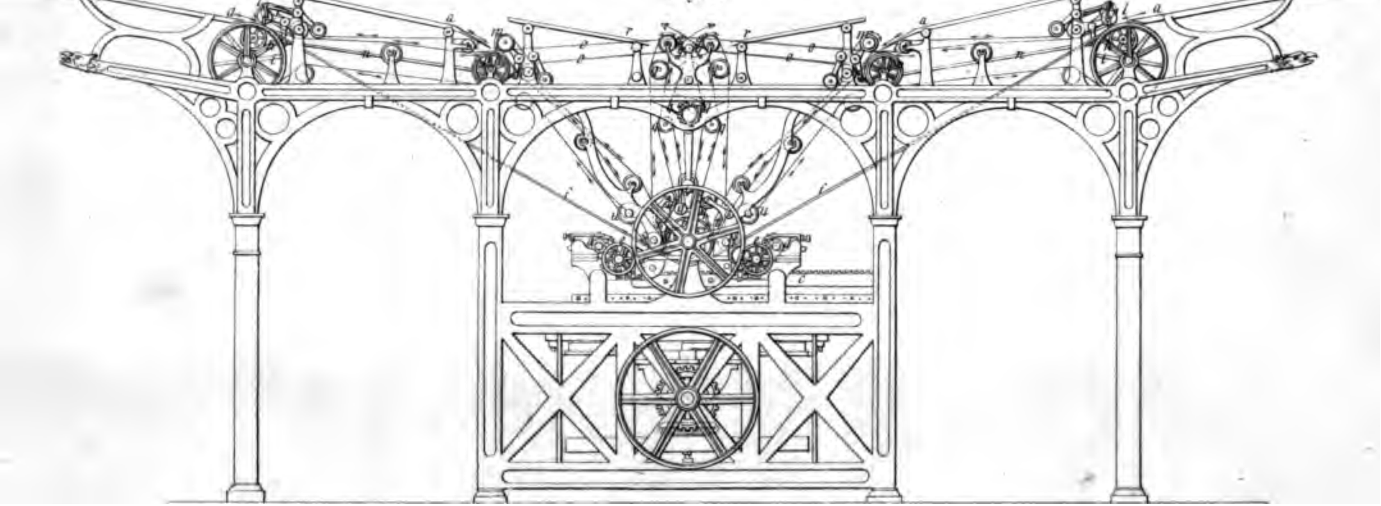
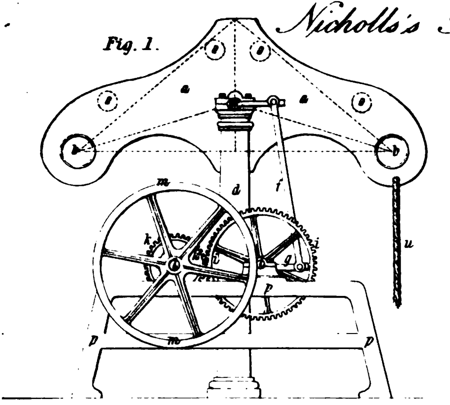


Nicholls's Power Lever.

Fig. 1.



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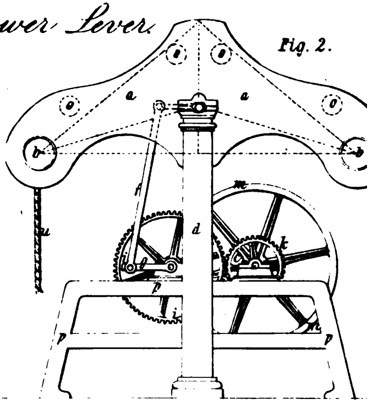
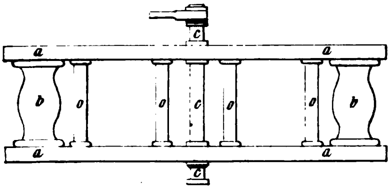


Fig. 3.



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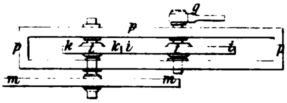
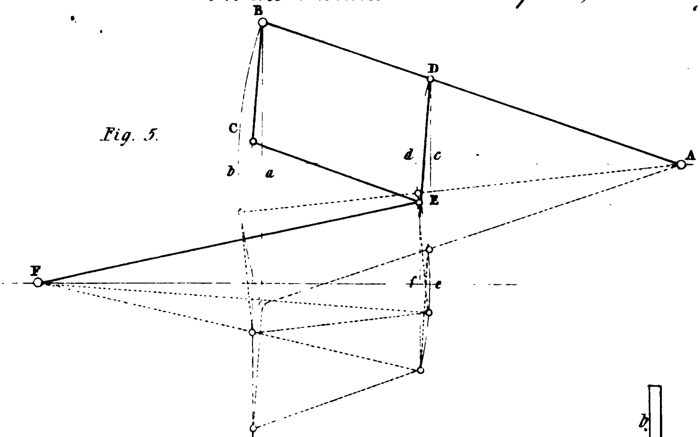


On the Parallel Motion of a Steam Engine.

Fig. 5.



Applegaths Printing Apparatus.

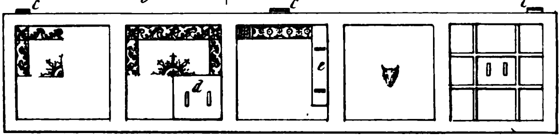
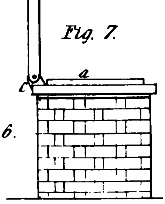


Fig. 6.

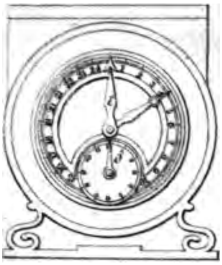
Fig. 7.



W. Newton Delt. October 1. 1829. F. Mansell Sc

Walker's Operameter.

Fig. 1.



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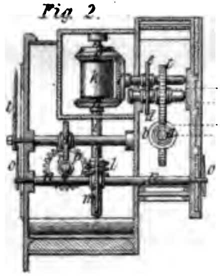

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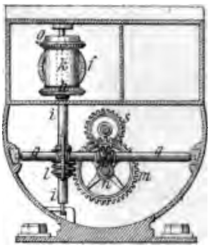

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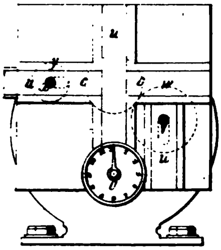

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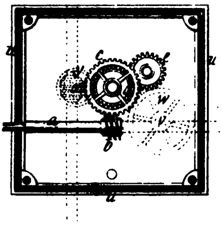

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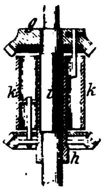

Bonner's Safety Lamp.

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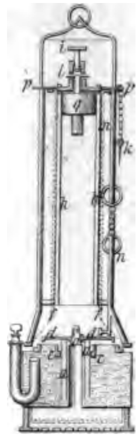

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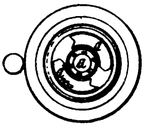

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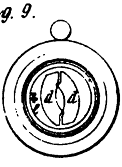
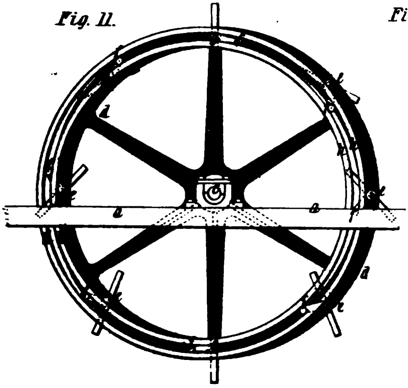


Fig. 10.

Pool's Impd. Paddle Wheel.

Fig. 11.



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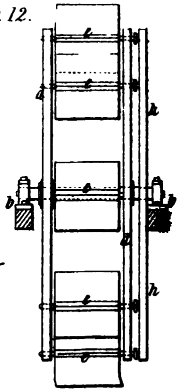
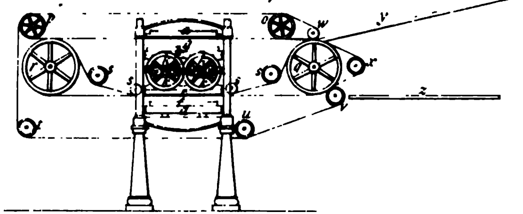


Napier's Printing Machinery

Fig. 2.



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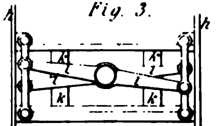

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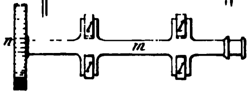

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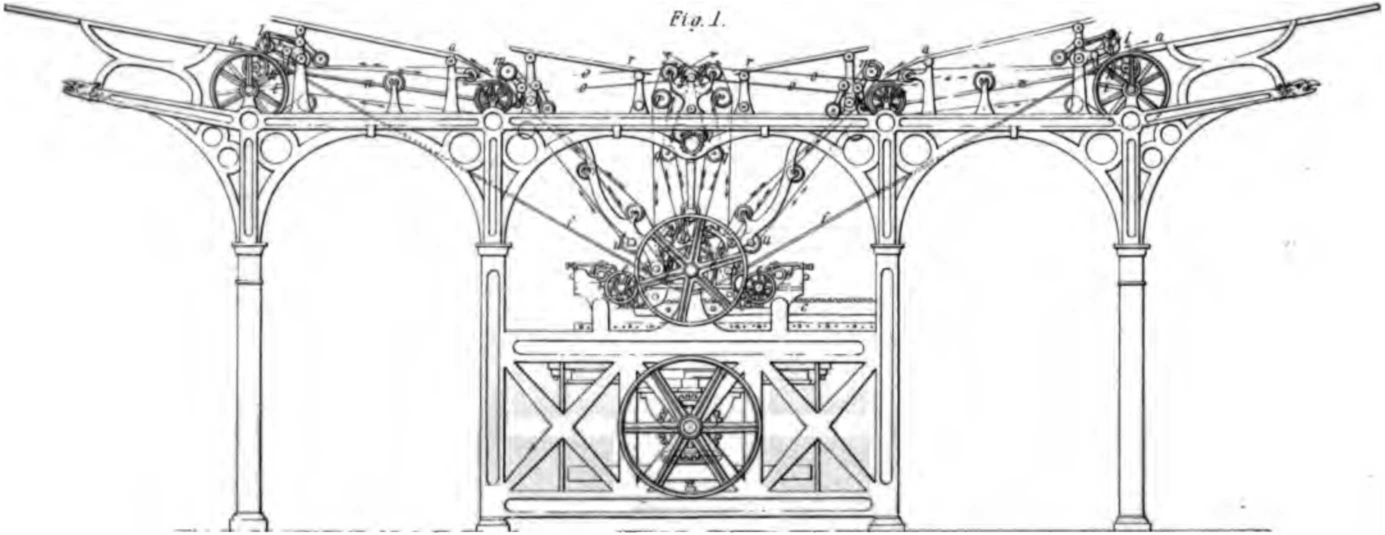

Nicholls's Power Lever.

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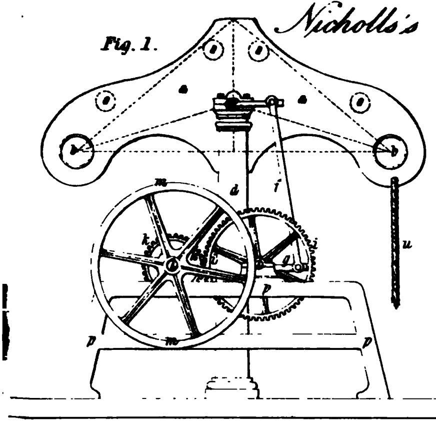

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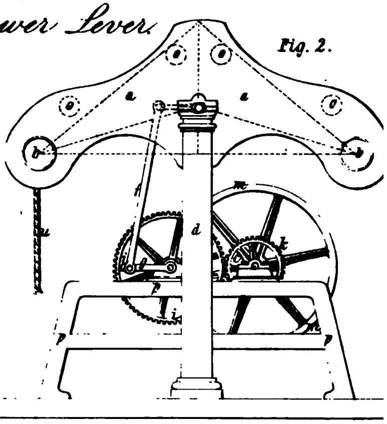

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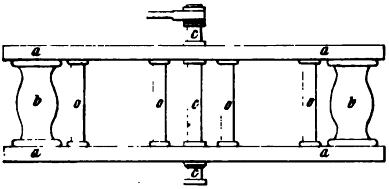

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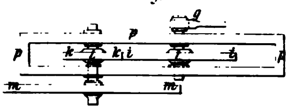
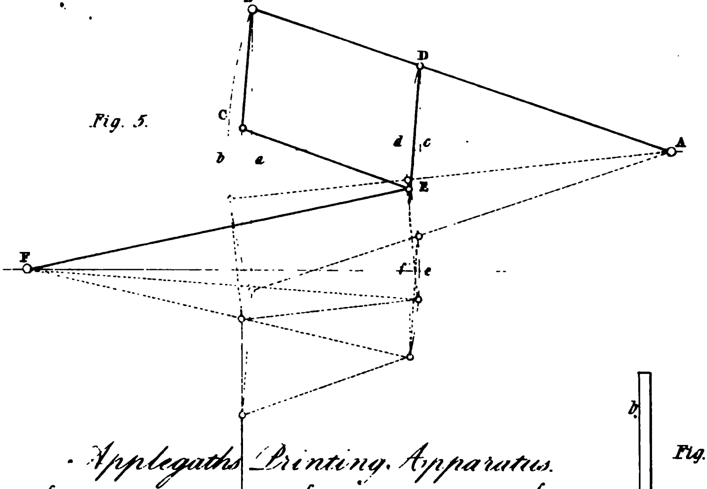


On the Parallel Motion of a Steam Engine.

Fig. 5.



Applegath's Printing Apparatus.

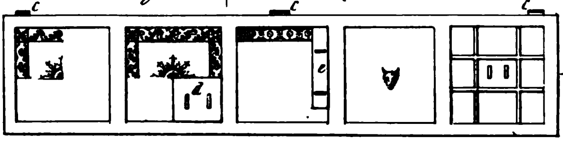
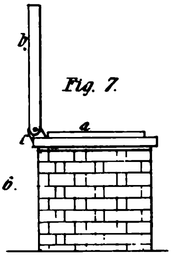


Fig. 6.

Fig. 7.



W. Newton Delt October 1. 1829. T. Mansell Sculp

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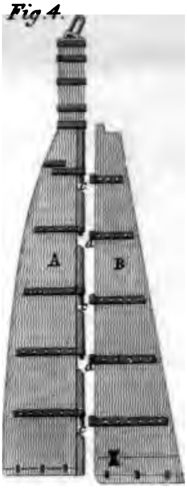
Fig. 4.



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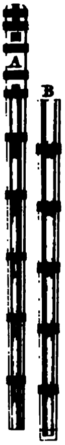

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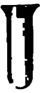

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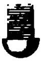

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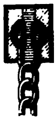

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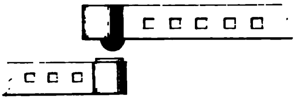

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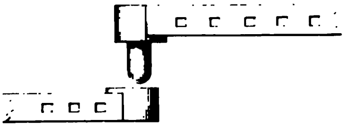


On the parallel motion of a Steam Engine.

Fig. 2.

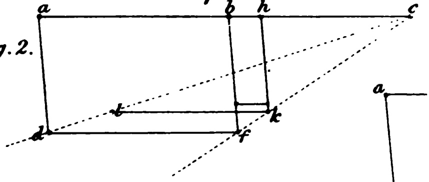
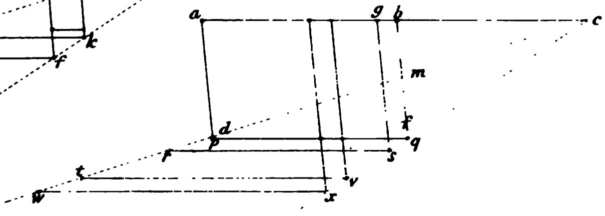


Fig. 1.



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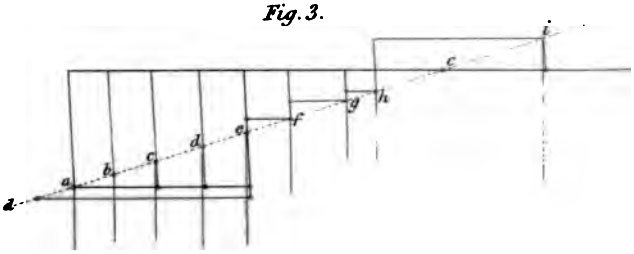

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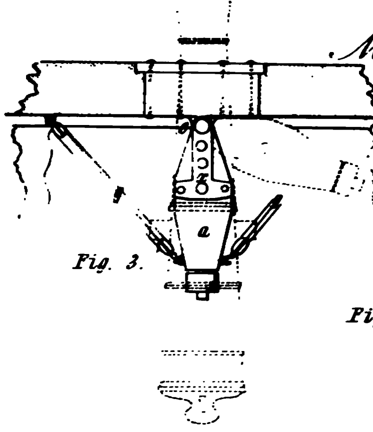
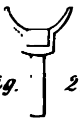
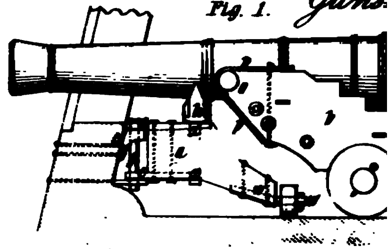
Marshall's Imp^{d}. method of mounti Guns.

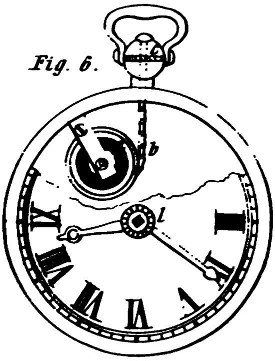


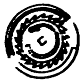


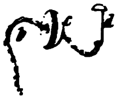


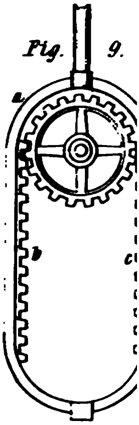
Perrolla's Watch.

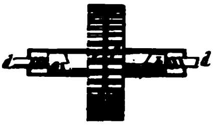
Apsey's substitute for a Cran



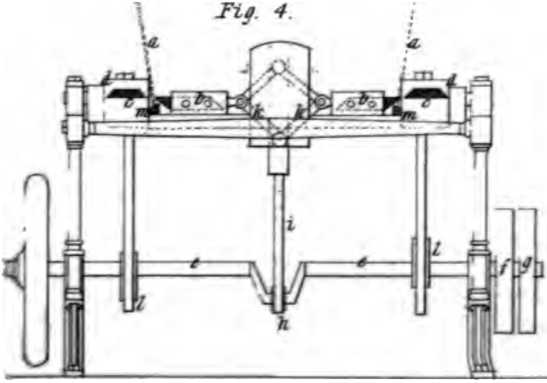








Ledsam - & Jones' machine for making Brads &c.



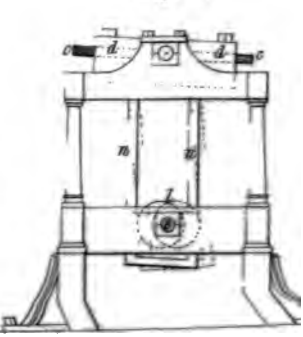
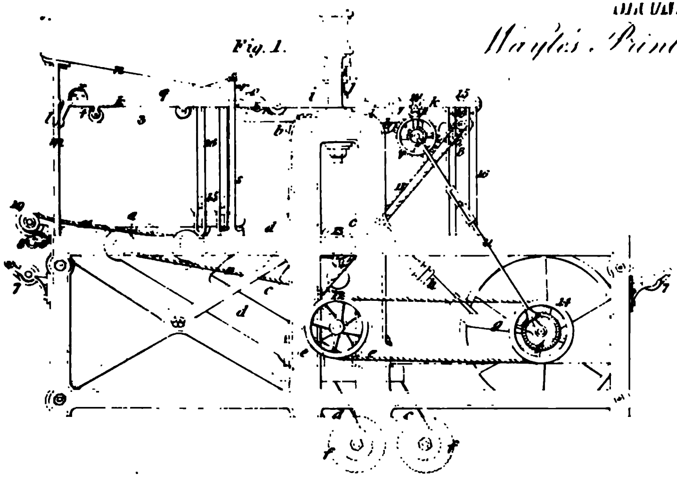


PLATE VI.

Napier's · Printing · Machinery.

Fig. 1.



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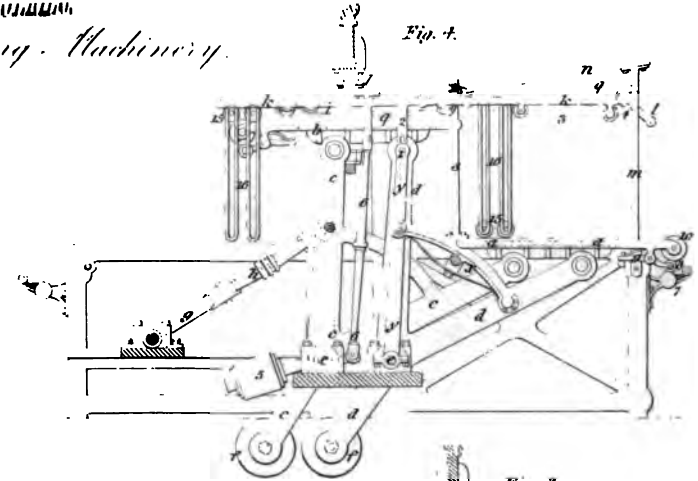

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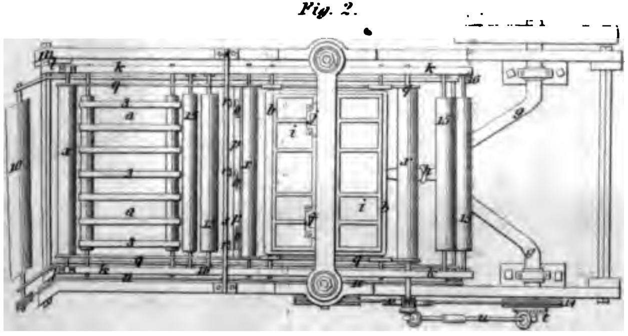

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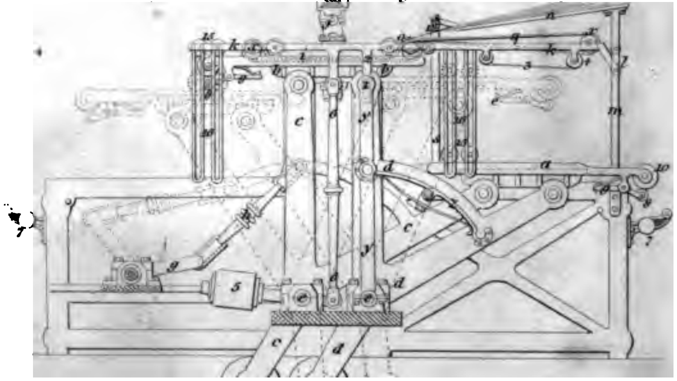
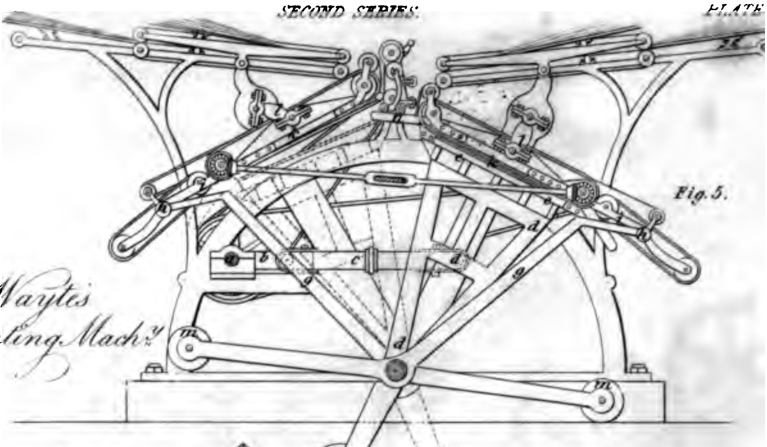


Waytes Printing Mach^y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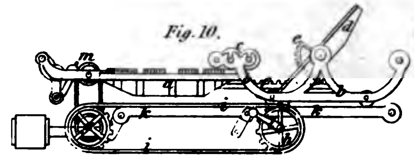
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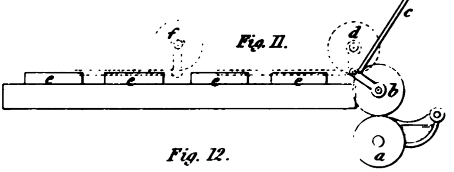
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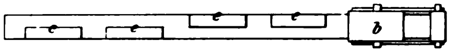
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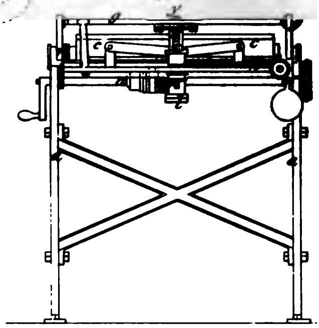
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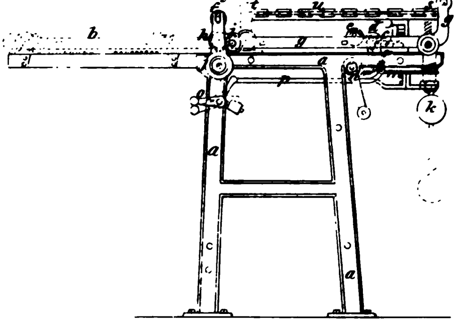
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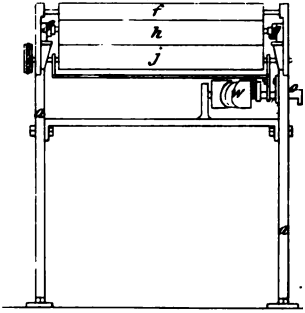
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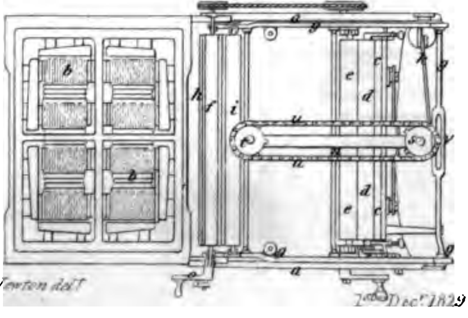
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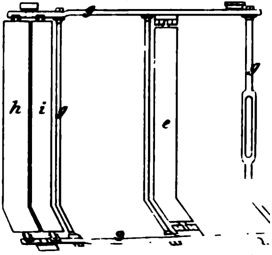
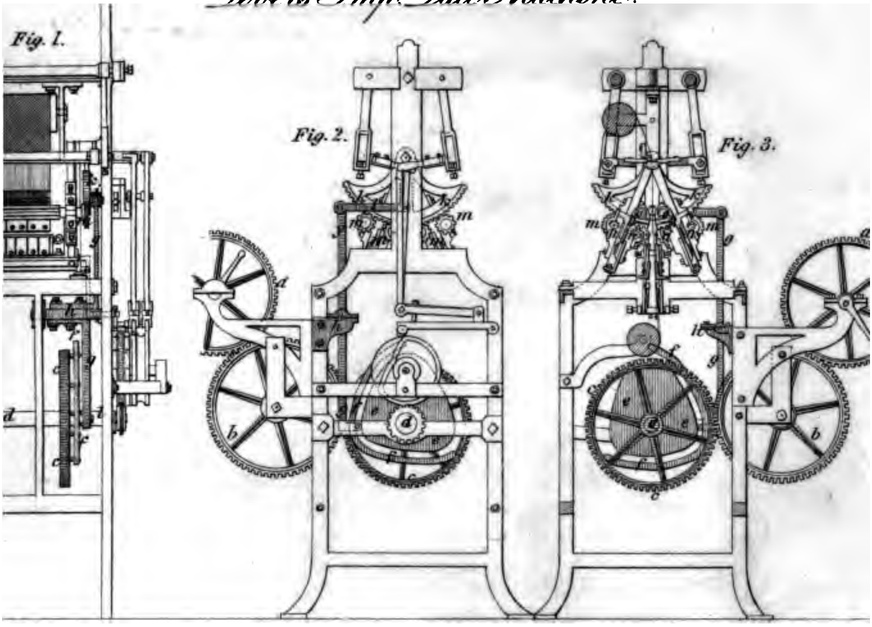


Fig. 9.

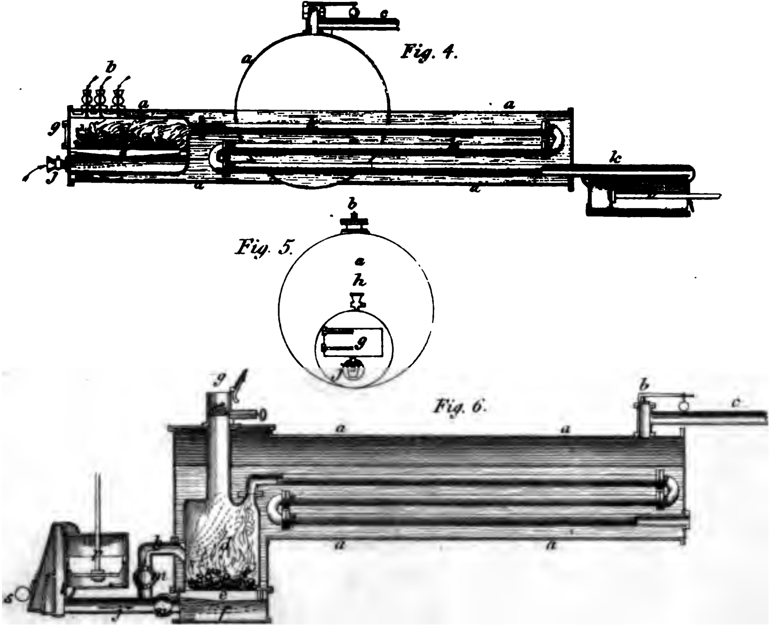
W. Newton del^t

2^nd Dec^r 1829.

Lever's Imp.ᵈ Lace Machine.

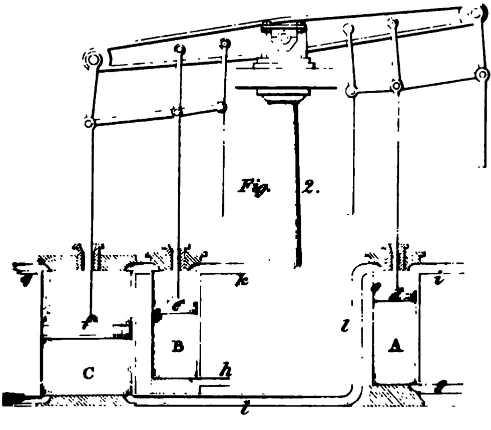


Braithwaite & Ericsson's Imp.ᵈ Steam generator.



Newton del.ᵗ 1ˢᵗ Jan.ʸ 1830. T. Phillibrow.

Aldney's. Impd Steam Engine.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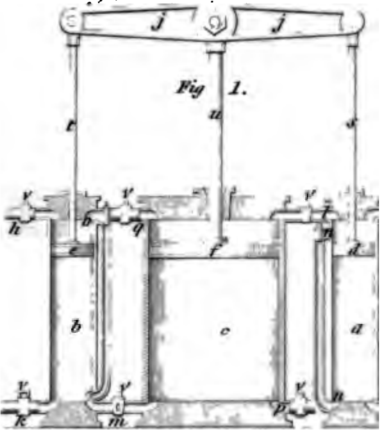
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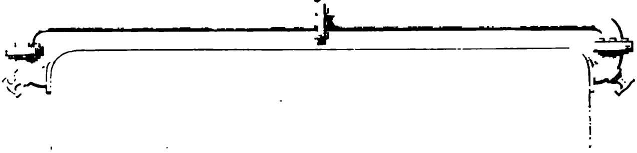
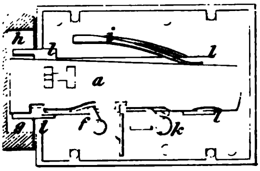
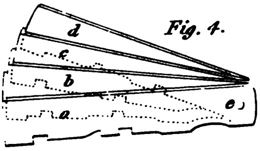
Fig. 3.



Chubb's. Impd Door latch.

Fig. 5.

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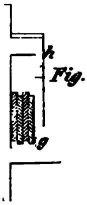


Fig. 6.

Marbot's. Machine for Cutting. Mouldings.

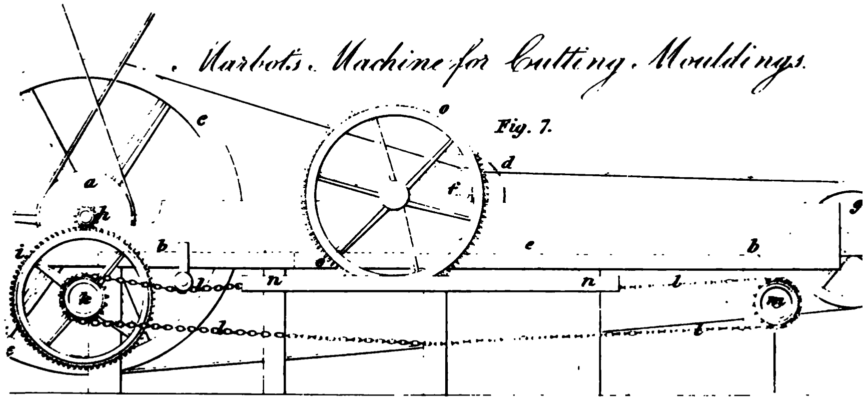
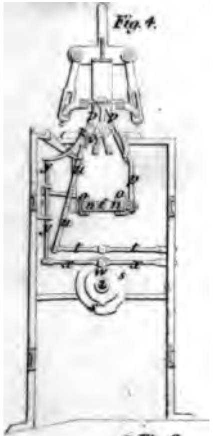


Fig. 7.

Levers Lace Machine.

Fig. 4.



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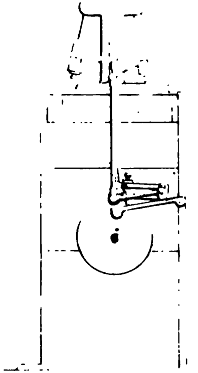

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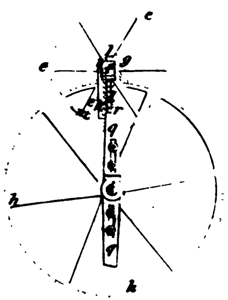

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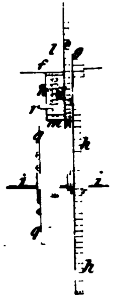

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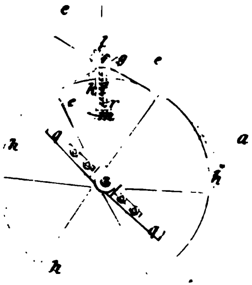
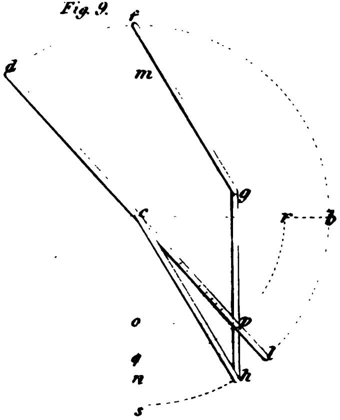


Avis on Refraction.

Fig. 9.



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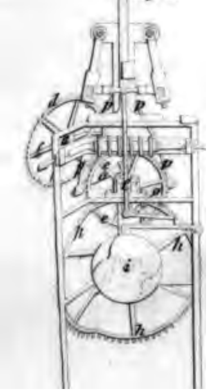

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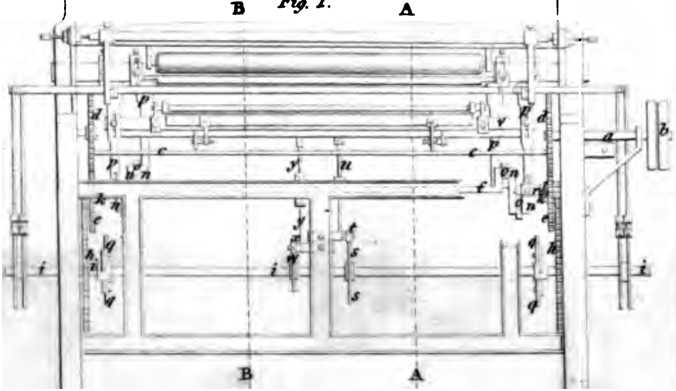

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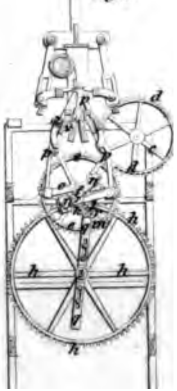

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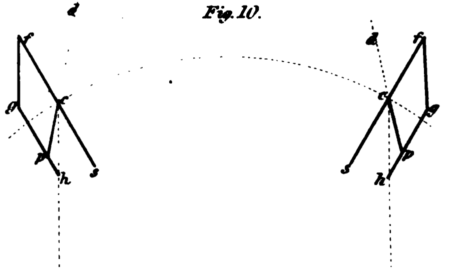
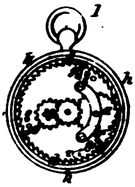


Brown's Impt. in Watches.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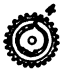
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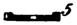
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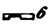
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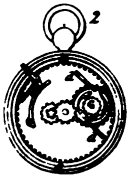
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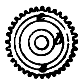
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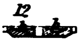
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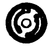
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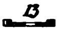
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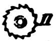
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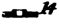
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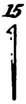
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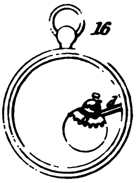
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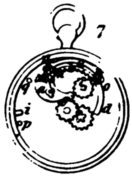
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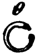
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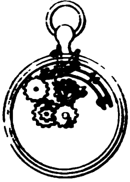
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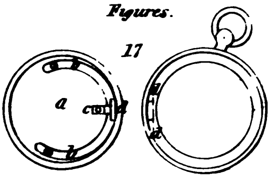
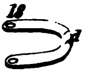
Figures. 17

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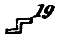
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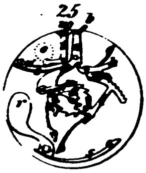
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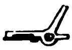
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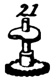
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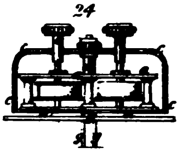
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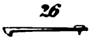
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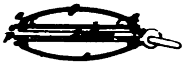
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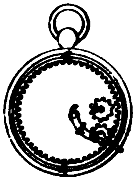
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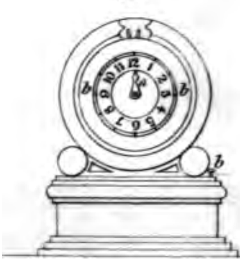
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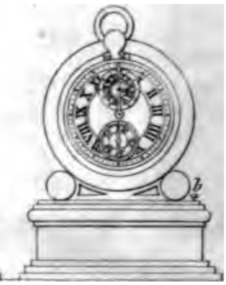
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Crompton & Taylor's Paper cutting machine

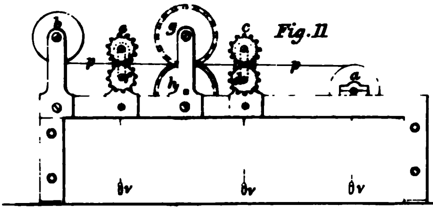
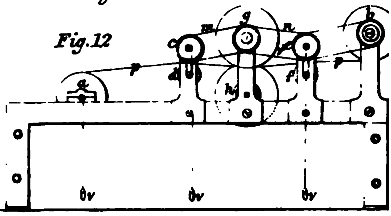


Fig. 11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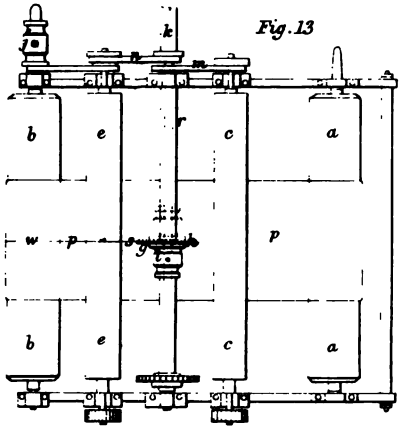
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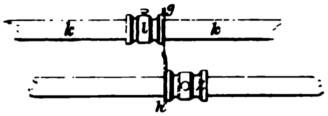
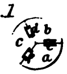


Fig. 14

Hillman's made masts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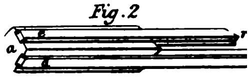
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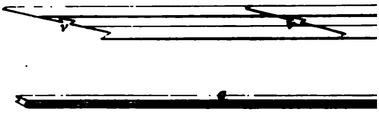
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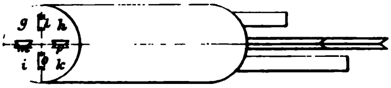
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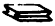
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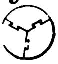
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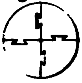
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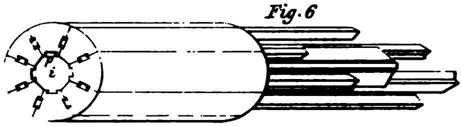


Fig. 6

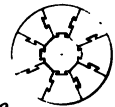


Fig. 10

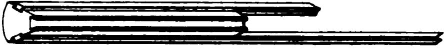


Fig. 7

Stead's improved paddle wheel

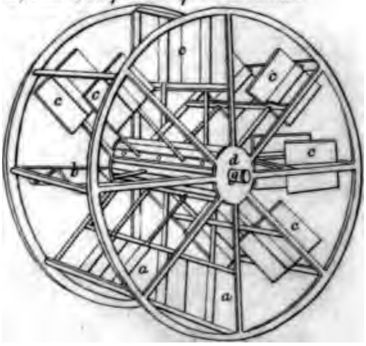


Fig. 15

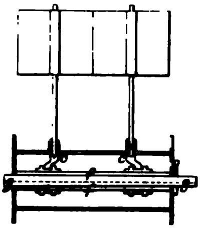


Fig. 16

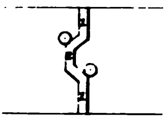


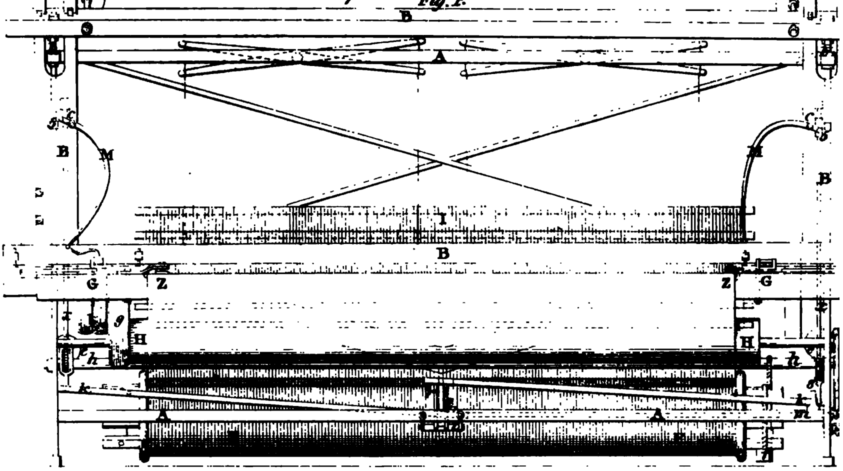
Fig. 17

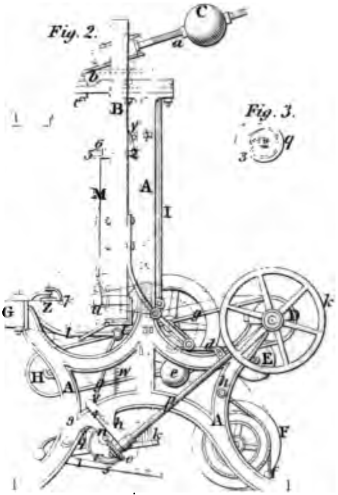
W. Newton, del. 1st Feb. 1830 F. Murr

SECOND SERIES.

Scholefield's imp.d Looms.

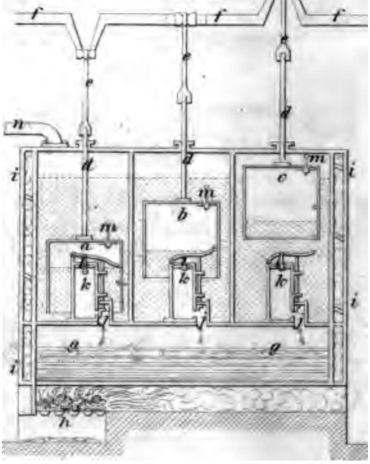
Fig. 1.





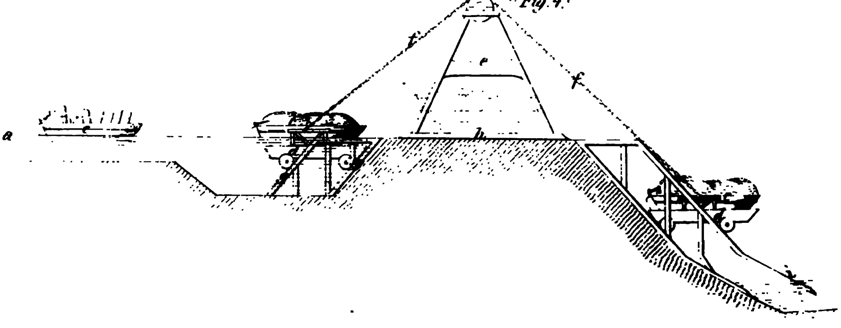
William's Vapour Engine.

Fig. 3.



Underhill's Imp.ts in Passing Boats, &c.

Fig. 4.



W. Newton del.

1st March 1830.

PL. IV.

Whites. Filtering Appa.tus

Pumphrey's. Imp.d Steam Engine

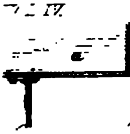
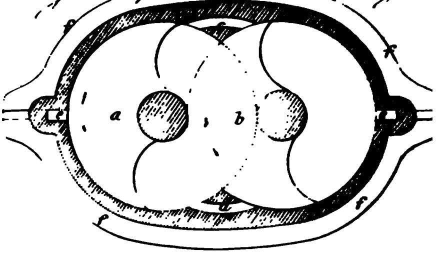


Fig 1.



Walker's. Imp.d Castors.

Fig. 2.

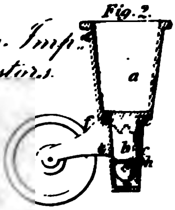
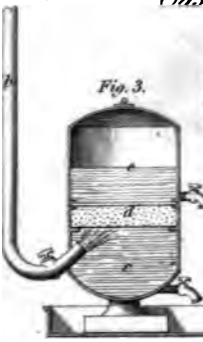


Fig. 3.



Carter's. Imp.d Roofs

Fig. 6.

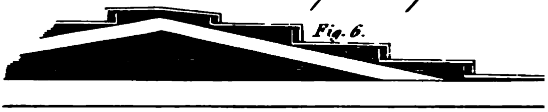
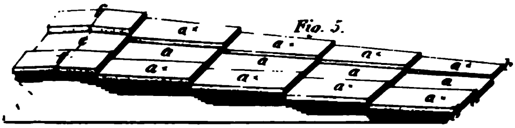
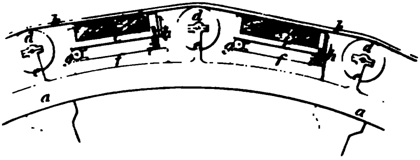


Fig. 5.



Daniel's. Imp.d Gig. Mill.

Fig 4.



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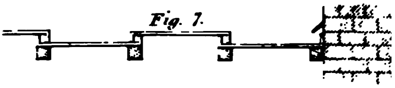

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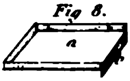

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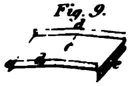
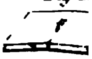


Fig 10



Griffin's. Imp.d Scythe.

Fig 15.

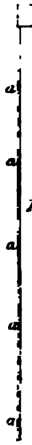
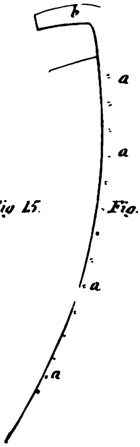


Fig. 14



Kneller's evaporating Appts

Fig 3.

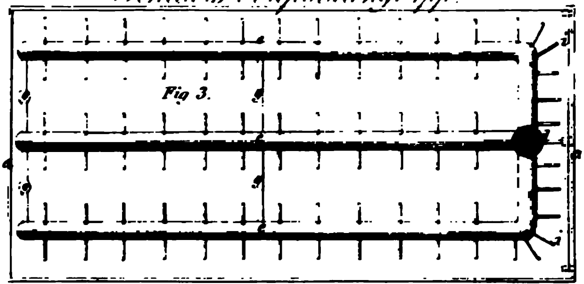


Fig. 4.

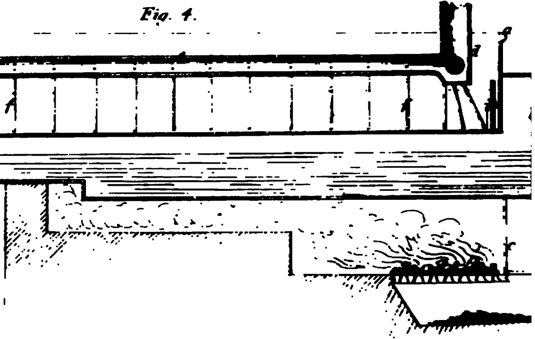
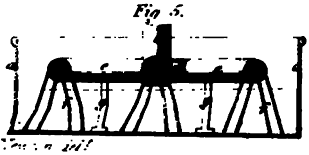


Fig. 5.



1st March 1830.

T. Pinll